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NOVEMBER 1947

Modern Methods and Equipment

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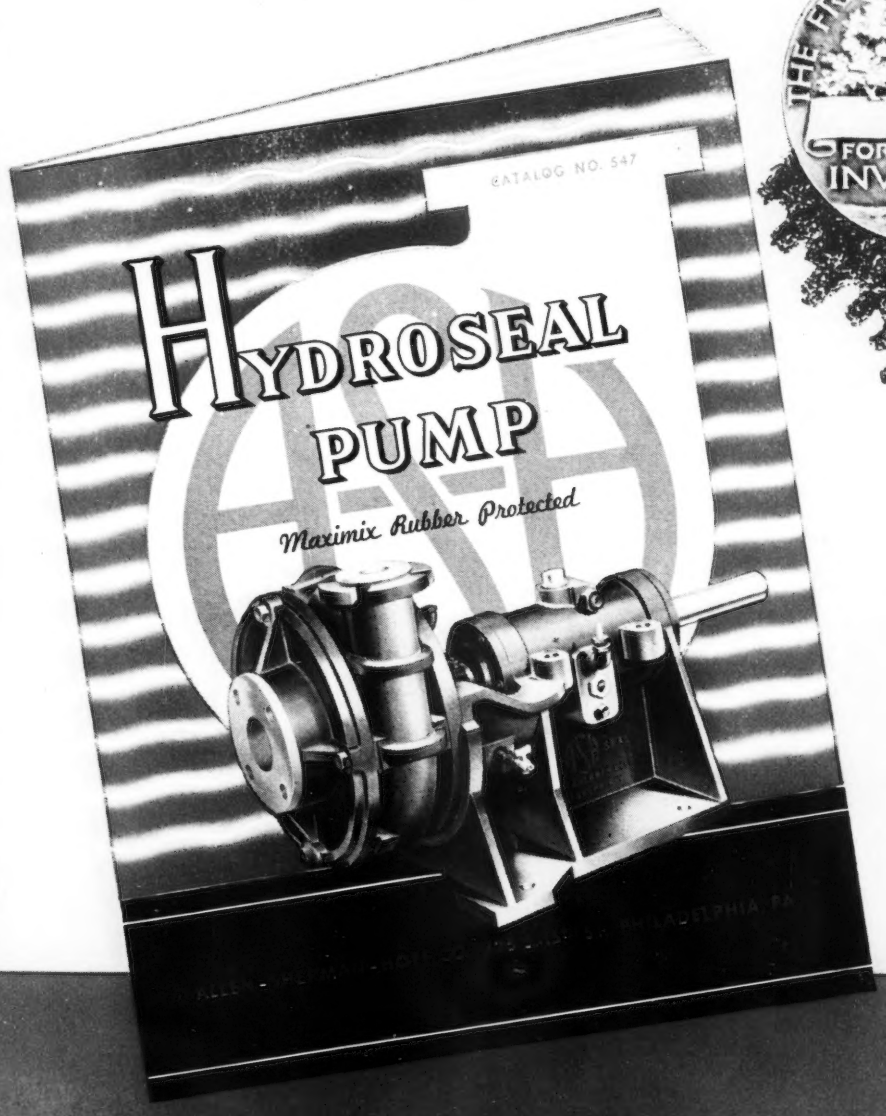
PRICE ONE DOLLAR

NEW CATALOG
Post-War Hydroseal Pump



The Franklin Institute was founded in 1824 and is not only the oldest, but the most outstanding institution in the United States for the Advancement of Science and the Promotion of the Mechanic Arts. Annually, since 1890, the Institute has awarded the Edward Longstreth Medal of Merit for Invention. The list of inventors and inventions so honored contains many world-famous names. . . . In April 1944, this award was bestowed for the invention of Hydroseal. The actual citation from the Institute reads as follows: "In consideration of the development of a pump (Hydroseal) which will successfully handle water or liquids containing abrasive materials, retain its initial efficiency and original discharge for considerable periods, with low maintenance cost and the successful manufacture of this type of pump (Hydroseal) giving satisfactory operation in many installations". . . . Naturally, we are proud of our achievement and the recognition it has been given. No other materials handling pump has been so recognized.

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Sand Pump (Materials, 100% minus ¼")
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Dredge Pump (Large and heavy materials, up to 6")

Performance tables of all eight standard sizes, with a capacity range from 10 G.P.M. to 12,000 G.P.M. Also, other useful tables and formula for selecting the correct Hydroseal for any pumping job, and a useful "How much money will it save me" graph. Entirely new, up-to-date information. Write for it today.

HYDROSEAL, PACKLESS AND MAXIMIX DESIGNS ARE COVERED BY PATENT AND APPLICATIONS IN THE MAJOR MINING CENTERS OF THE WORL

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ENGINEERING AND MINING JOURNAL

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Modern Equipment and Methods

THE PICTORIAL REVIEW of new equipment, improved practices, and modern methods in mining, milling, and reduction presented herewith is offered to give the reader a birds-eye view of new opportunities to improve his methods; also to refresh his mind after seven years of concentration on simply getting out the most production with the means at hand.

It is now evident that the world's mineral needs will continue to tax the capacities of established sources of production. Thus, and particularly in view of the manpower and labor relations problems facing the industry, it behooves operators to scrutinize carefully all possible opportunities to improve their technological practices. Only through their following such a course can the industry find the hidden resources on which its future depends, mine the lower grades of less accessible ore remaining in known deposits, pay the increased labor costs facing it, and provide the living and working conditions that in the future will be necessary to attract high-grade workmen.

Naturally in compressing a panorama of the mining industry into a single issue, it is infeasible to give details of the items included and their advantages; however, the editors can furnish additional details and references, also the names of manufacturers of particular items, to readers who are interested.

The editors express their sincere thanks to the numerous operators and manufacturers whose cooperation has made this issue possible.

GEOCHEMISTRY offers promise in prospecting. Methods include careful analysis of plant ashes, of surface or underground waters, of subsoil, outcrops, and drill cores or cuttings, seeking ore minerals, rare elements or other evidence of passage of mineralizing solutions. The spectroscope is a rapid, accurate analytical tool. A similar method is study of hydrothermal alteration of country rock, as done at Tintic by Lovering, et al.

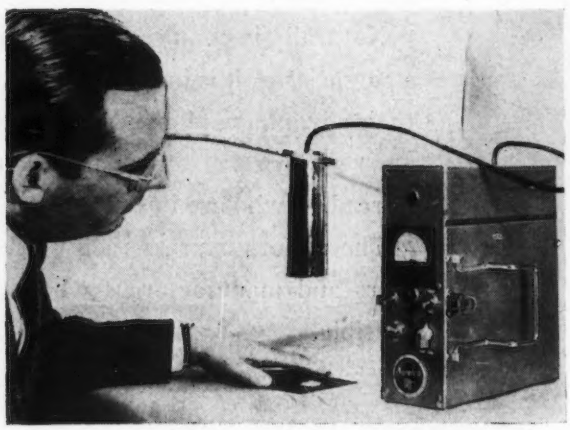
THE AIRBORNE MAGNETOMETER offers great advantages for rapid surveying of large areas, for freedom from troublesome surface anomalies, for depth finding, and for submerged or jungle areas. Either the airplane or helicopter can be used.

THE OLD PROSPECTOR'S EXPLORATION

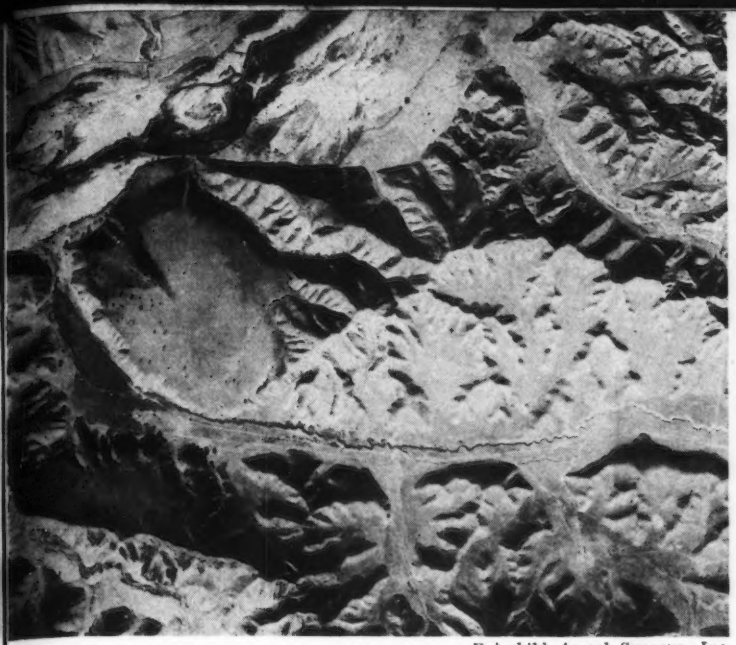
THE RATIO at which mineral resources are being depleted makes better ways of finding them of the utmost importance. The new developments portrayed herewith are all valuable contributions to that end. To these we can add such items as the tracing of significant beds like the Rand quartzites underground by seismic and gravimetric methods, and the use of the violet ray in searching for fluorescent minerals.

NEW ULTRA-SENSITIVE Ruska vertical magnetometer, tested by Kansas State Geological Survey, has given improved results in detection of geologic structure in Tri-State district.

CONTINUOUS IMPROVEMENT of instruments for electrical surveys makes induction, resistivity, equipotential, and self-potential methods more and more useful to the prospector. This semi-portable instrument penetrates deeper than one-man type.



GEIGER COUNTER has not only proved useful for detecting radioactive ores, but has demonstrated its ability to reflect geologic structures and to "doodle-bug" oil pools. This model permits use of dial or earphones at operator's option.

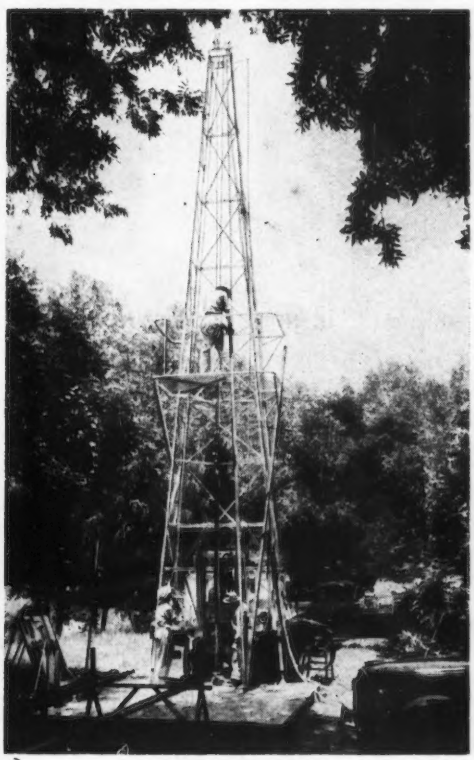


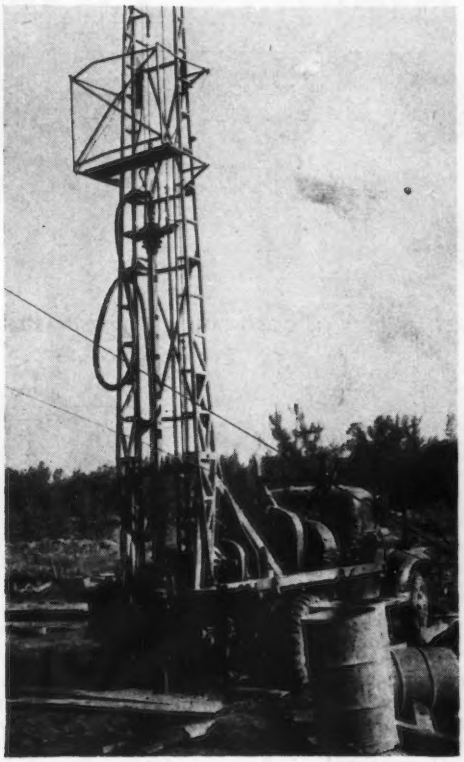
Fairchild Aerial Surveys, Inc.

BURRO HAS SPROUTED SILVER WINGS

AERIAL PHOTOGRAPHS serve the modern prospector as base maps for surface work and as a rapid means of detecting geologic structures, of scrutinizing the surface, and of noting vegetative belts. Work in difficult terrain is simplified. With stereo pairs close studies can be made or contour maps prepared.

THE AIRPLANE is a vital part of modern prospect drops and picks up prospectors, greatly lengthening t particularly during the short open season of the Nor and enables management to shift them quickly





TO CUT DOWN MOVING TIME, MODERN EXPI

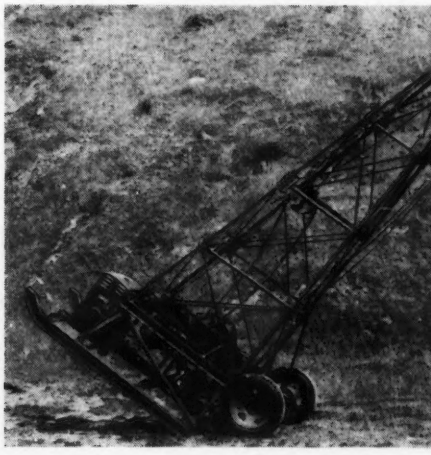
WITH TALL MAST and truck mounting for fast drilling and moving, this large drill is available either with automatic chuck or oilfield-type rotary table and "kelly", plus hydraulic feed.

TRUCK-MOUNTED oilfield-type, with rotary table and "kelly," this drill maintains weight control by crank-operated chains which pull up or down on arms fastened to swivel. Mud circulation is used.

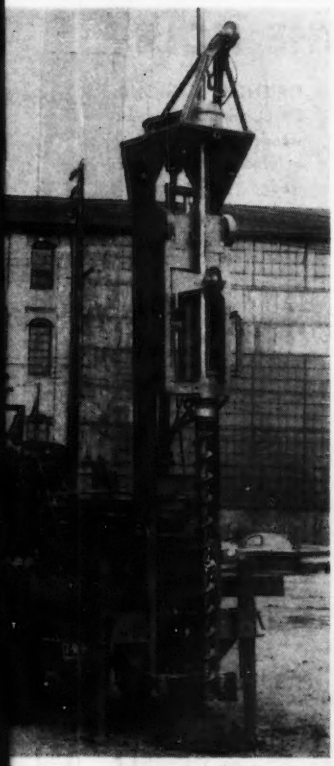
THIS TRUCK-MOUNTE quick moving and rapid circulating fluid is used, medes screw f

COLOR PHOTOGRAPHY of drill cores, as practi
for easy storage and quick, convenient examinatio
physical characteristics of the cores. This vi

prospecting in undeveloped country. It
thening their effective time in the field,
the North. It also drops them supplies
m quickly if a new strike occurs.



CHURN DRILL has wheel mounting, permitting qu
of truck investment. Drill can winch itself



EXPLORATION DRILLS ARE VEHICLE-MOUNTED

OUNTED rotary drill is designed for
d rapid drilling in soft formations. No
is used, cuttings being raised by Archi-
s screw flanges on drill stem.

WHEEL-MOUNTED rotary drill, used for rapid drilling of softer formations, Uses three-wing, hard-metal bit, and drills without fluid, raising cuttings by screw flanges.

XUM

es, as practiced by St. Joseph Lead Co. in Missouri, provides t examination of drill records without sacrificing any important cores. This view shows how the cores are photographed.

permitting quick moving with minimum of labor and elimination winch itself out of soft ground or over rough terrain.

od for three- t fluid, s.

JEEP -MOUNTED diamond drill can go almost anywhere quickly. Driven by Jeep engine and rated at 450 ft. of NX rods. Can be readily set aside to free Jeep for other uses.

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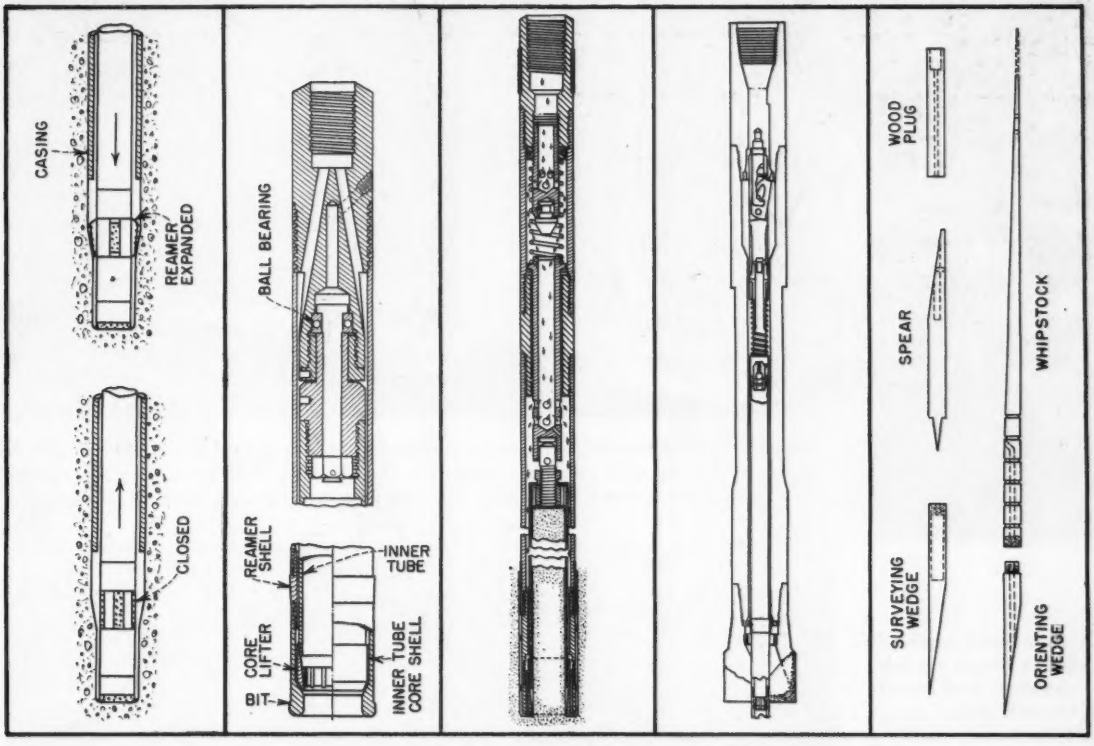


GETTING A BETTER JOB DONE DOWN THE HOLE

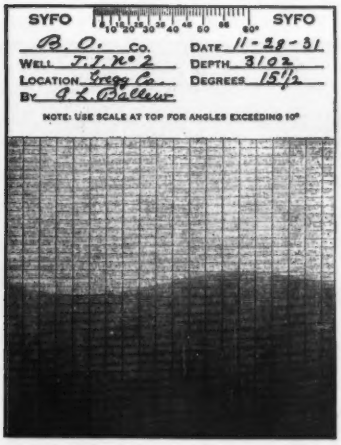
DIAMOND - STUDDED rotary underreamer, used for drilling a hole beyond casing large enough for casing to follow. Convenient in ground where hole walls fail to stand up.

BALL - BEARING, double-tube core barrel, designed for better core recovery, because of frictionless suspension of inner barrel and location of core lifter inside inner barrel.

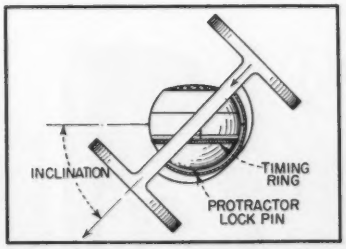
DOUBLE - TUBE core barrel with water shut-off to warn when barrel is full. Core lifter is out of entrance, and circulation is designed to prevent erosion and probable loss of soft cores.

RETRACTABLE core barrel, used in larger holes with all kinds of bits, can be run in, used and withdrawn without removing drill or stopping circulation. Big saving in time results.

ORIENTED DIAMOND-DRILL whipstock uses a wooden plug, chisel-pointed spear with wedge top, surveying tool, and bit deflector with adjustable wedge for accurate control.

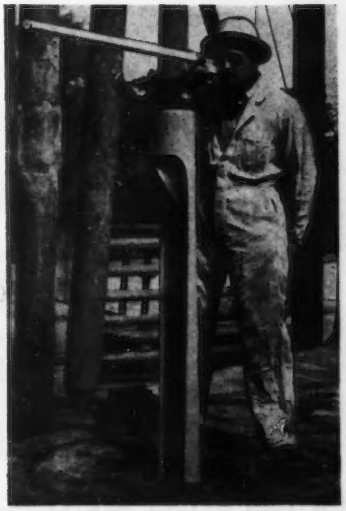


SYFO-CLINOGRAPH record of inclination is made by siphoning ink in and out of chamber lined with graduated sheet of paper. This single-shot instrument is available in diameters as small as one and a half inches. Wave crest-to-trough space shows inclination.



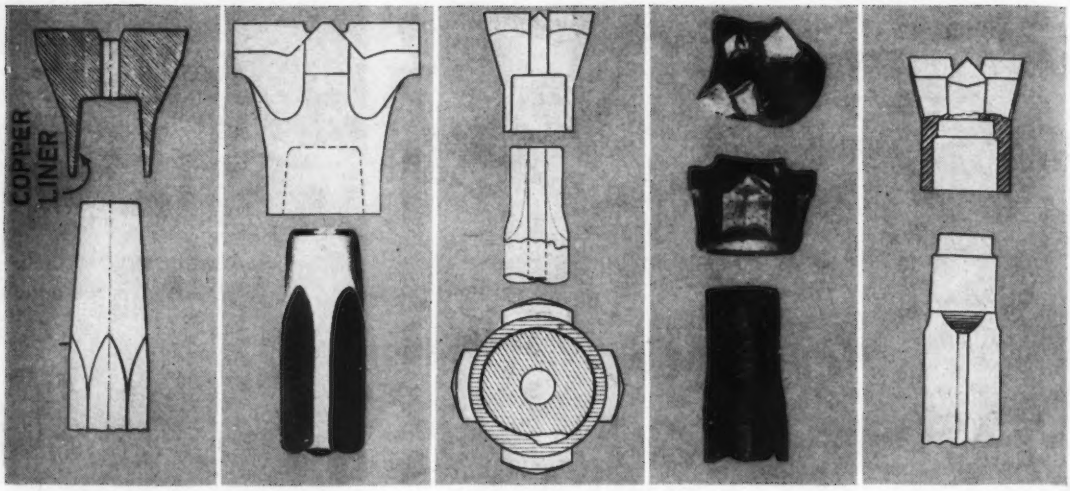
TRO-PARI surveying instrument obtains both inclination and direction by time locking compass and plumb bob-protractor combination.

SINGLE-SHOT inclination-direction records are made on small discs by plumb bob and compass. Diameters 1-5/16 in. up. Available for rent.



ORIENTATION OF INSTRUMENTS or whipstocks is maintained by sighting devices clamped to drill pipe. Useful for small or large drill pipe.

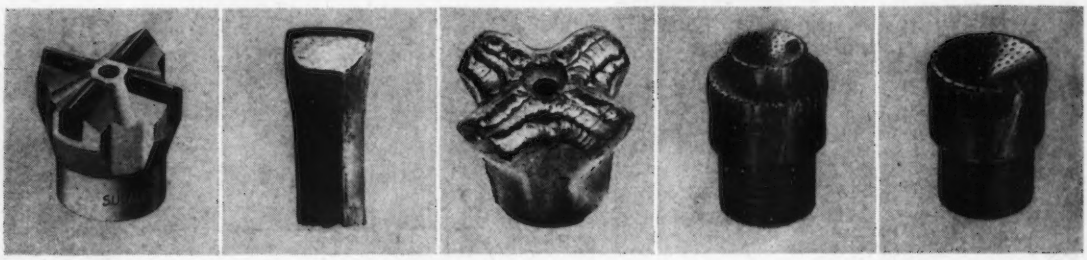
XUM



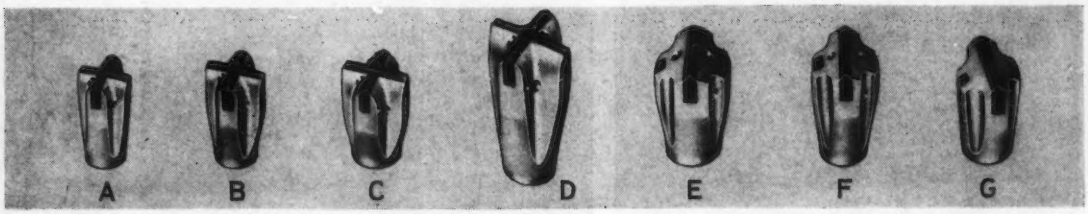
1. SIMPLON 2. P. & M. 3. CRAIG 4. LIDDICOAT 5. REDINGTON

Types 1 to 5, inclusive, are threadless detachable bits, some of which, like 3, are one-pass bits. Others can be re-sharpened. Simplon bit has copper lining which aids in attachment. P. & M. bit skirt tapers slightly more than end of steel and cutting edges are flattened. Cross section of Craig bit socket is spiral-shaped to aid in locking bit to steel. Tooth design of Liddicoat bit produces two-stage cutting action. Redington bit fits cam-shaped steel end.

DRILLING AND BLASTING



10. SULMET 11. COROMANT 12. HARD-FACED 13. NON-CORING DIAMOND BITS

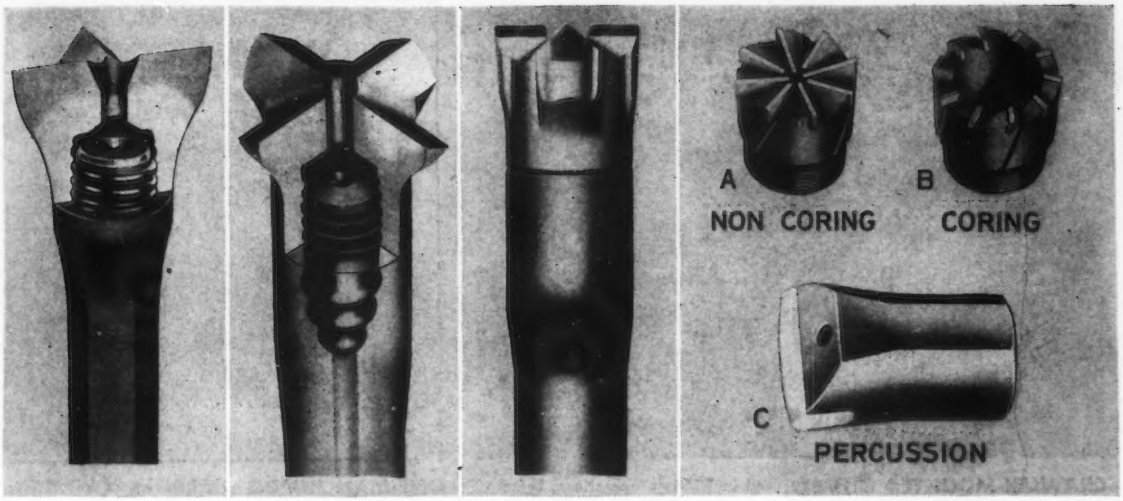


14. FIRTH STERLING BITS

BECAUSE BLAST-HOLE DRILLING is an important expense in mining, much attention has been given to bits, as evinced by those illustrated here. Conventional steel gave way to many types of detachable bits. Then blast-hole diamond drilling invaded the field; and recently, hard-metal insert types. Competition between these types remains keen.

Advantages claimed for tungsten carbide bits are: Increased drilling speed, less time lost for changing bits, opportunity for long drill feeds, and blast holes do not taper. Sulmet bit (No. 10 above) can be re-sharpened. Hard-metal insert is attached directly to steel in Coromant chisel type (11). Firth Sterling (14) bits have brazed tungsten inserts attached by special forging method to prevent edge cracking. Types A, B, and C are used in drilling secondary blast holes; bit D in medium blast holes, and E, F, and G are single chisel types for secondary blast holes.

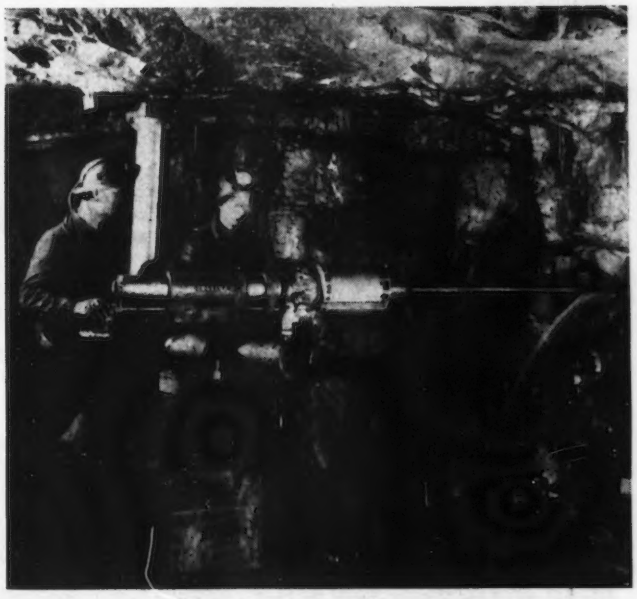
Hard-faced bits (12) have performed well in western mines. One hard-surfaced bit retained gage after drilling 200 ft. of oil shale. Coring and non-coring bits (13) are used for blast-hole diamond drilling.



6. TIMKEN 7. STUD JACKBIT 8. STUD CARSET 9. KENNAMETAL BITS

Types 6 and 7 are threaded detachable bits. Timken bit shows penetration of hardening, and seating of bit on steel. New Stud Jackbit has extra metal in bit skirt and attaches to thread of stud driven into steel. Types 8 to 11, inclusive, and 14 are hard-metal insert types. Carset bit is interchangeable with Stud Jackbit. Kennametal bits include coring (B) and non-coring (A) rotary types, and percussion type (C), all with hard-metal inserts. Other hard-metal insert types of bits appear on page 96.

Air Powered



Electrically Powered

BLAST-HOLE DIAMOND DRILLING

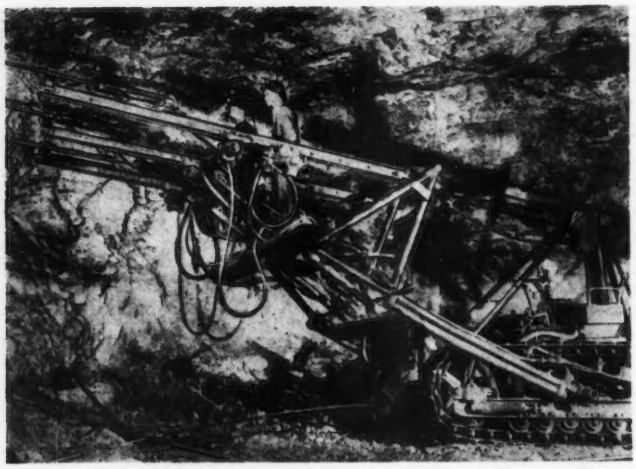
SINCE NORANDA MINES substituted the diamond drill for percussion drills to break ground in stopes by long-hole methods in 1937, more than 40 mines have employed blast-hole diamond drilling for stoping operations. Advantages reported for this method of drilling are: increased tonnage per machine shift, less labor required, supervision is easier, diamond-drill runners can be trained easier than miners, diamond drilling is faster in very hard ore, drills are quieter, less dust is raised than with percussion types.

Machines used are predominantly air-powered. However, electrically-powered types have been used with success at a number of properties including the Soudan mine, where the ore is unusually hard.

Both coring and non-coring diamond-drill bits are used for a blast-hole work, the latter including concave and pilot types. Coring bits are frequently used for harder ground. More recently bits like the Kennametal coring type, shown above, have been used in long blast holes through soft hematite ore. In the absence of chert the bits penetrated 100 to 150 ft. of ore without resharpening.

In addition to stoping, blast-hole diamond drilling has been used for drifting, raising, and sinking.

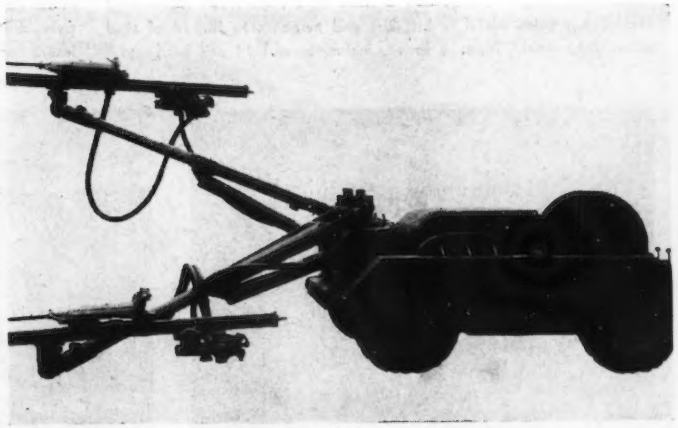
(*Continued on next page*)



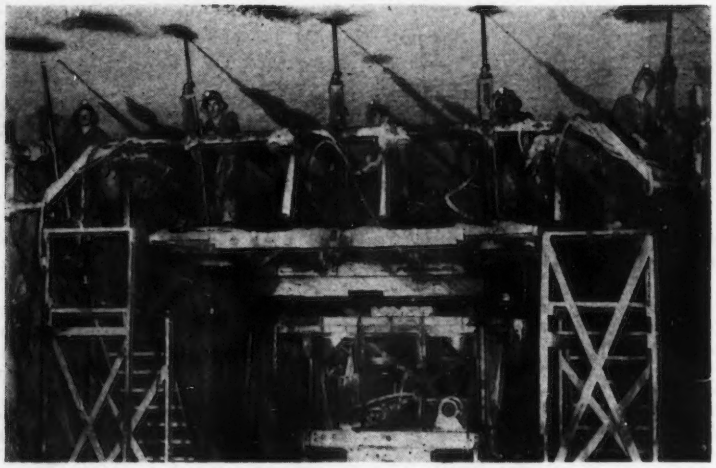
CRAWLER-MOUNTED JUMBO used in Tri-State operations. Three drifters are mounted on wagon-drill sashes and moved by chains, sprockets, and air motors. Two men operate three machines. Drill steel is ten feet long

ONE-MAN JUMBO devised by R. W. Neyman, superintendent of Hecla Mining Co., is equipped with pneumatic column. Flanged wheels can be used on track.

FOLDING JUMBO used at Bunker Hill mine can be skidded into trackless intermediate drifts.



RUBBER-TIRED-MOUNTED JUMBO is self-propelled. Drill jib is controlled hydraulically. Long feed is good for drilling with tungsten-carbide bits.



FIVE-MACHINE, TRACTOR-MOUNTED JUMBO for blasting rock in large flat open stopes. Mobile unit is designed to permit proper spacing of drill holes so that fragmentation will not be excessive. Drifters are equipped with power feed.

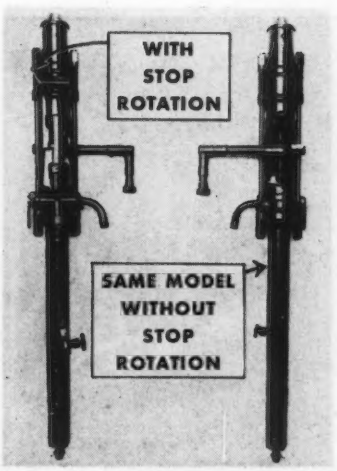
TRACK-MOUNTED JUMBO for two machines is equipped with gear rack and crank to raise cross-arms on column.

MAKING COMPRESSED AIR WORK. Drifter (at left) is mounted on pneumatic crossbar for shaft sinking operations. Machine works while miner watches. Reverse-feed stoper (in center) is mounted on long pneumatic column. This set-up is especially good for high and narrow stopes as shown. Pneumatic leg on jackhammer (at right) applies pressure on steel, and spares the operator effort.

ELECTRIC AUGER DRILLS mounted on posts are suitable for soft ores and non-metallics. Unit above is used in potash mine.

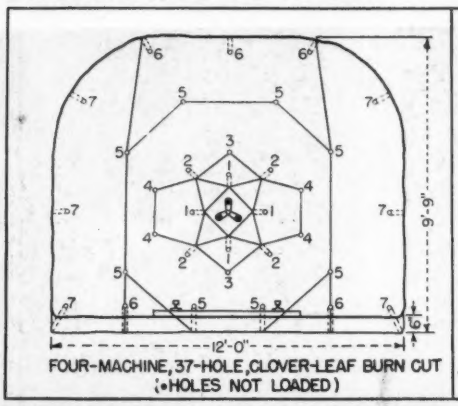
AIR POWERED AUGER DRILLS. Hand-held, air-operated type shown above is used for drilling in non-metallic mines.

LIGHTNESS is the outstanding feature of this new drill weighing only 83 pounds. Length of the stoper is 56 inches.

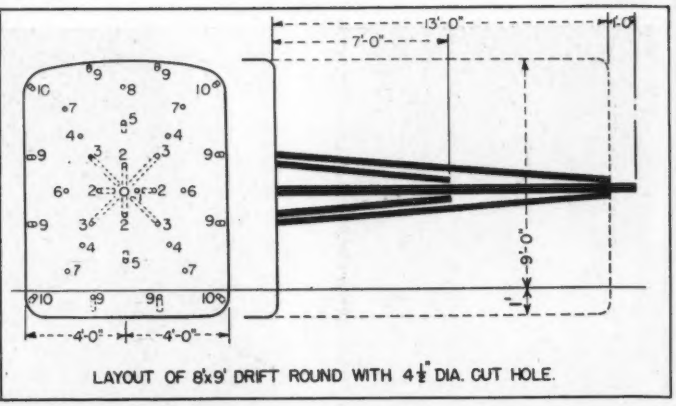


ROTATION CONTROL. Small lever near top is pulled down to stop rotation and raised to continue rotation.

SAFETY. This stoper supports itself while steel is being changed. Stoper can operate by itself under loose ground.

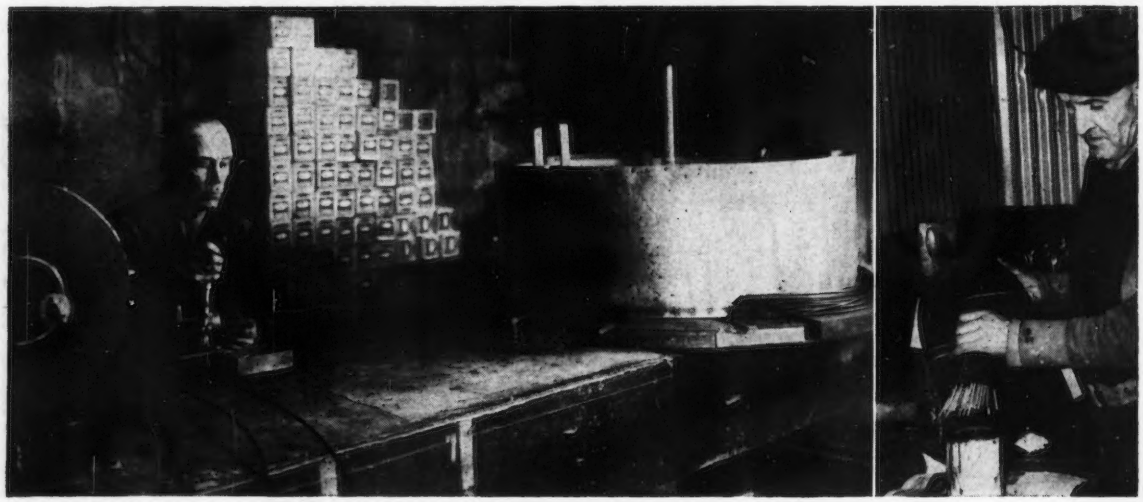


FOUR-MACHINE, 37-HOLE, CLOVER-LEAF BURN CUT (•HOLES NOT LOADED)



LAYOUT OF 8'x9' DRIFT ROUND WITH 4½" DIA. CUT HOLE.

EXPERIMENTAL DRILL ROUNDS. Clover-leaf burn cut at left was developed by Calumet & Hecla staff after much painstaking research. It proved highly successful in driving approximately 800 ft. of drift. Experimental work with deep rounds and large-diameter cut holes (4½ and 6¾ in.) as shown at right, indicates that large hole cuts may be a means of increasing drifting efficiency at International Nickel Co. operations. Present standard cut holes are 2¾ in. dia.



CARE IN PREPARING FUSES is important to prevent misfires. Reel at left is used to coil fuse before it is cut with knife-edged saw blade. Fuses are exact length and squarely cut. Dipping fuses (at right) in waterproof compound assures detonation.

PREVENTING PREMATURE BLASTS. Loading accidents have virtually been eliminated at Eagle-Picher operations by protecting caps with rubber cover (left), and then placing "shot" in safety tube after cap has been inserted in stick of powder.

EXPLOSIVES CAR

SECTIONAL LOADING STICK

SELF-DETONATING FUSE

HANDLING EXPLOSIVES

COMBINED EFFORTS of safety engineers and manufacturers have made explosives handling a safer job today than previously. New caps are less sensitive but more powerful and high-ammonia-content explosives are now less sensitive to flame and shock. Electric detonators are now shunted at the factory. Self-detonating fuse, electric igniters, and bunch blasting contribute to safety in primary and secondary blasting.

USING BATTERY LOCOMOTIVE TO SET OFF TUNNEL BLAST

BEFORE

AFTER

THE SHAPED CHARGE

DIMENSIONS OF BLOCK broken by shaped charge (above) containing 0.4 lb. of powder are 2½ ft. x 10 in. x 18 in. Intense interest of mining men all over the world in this application of the "Munroe effect" indicates alertness of industry for any new principle which may be used to increase efficiency and lower costs.

In addition to experimental work on secondary blasting now in progress, experiments are contemplated for primary blasting in open stopes in this country and abroad. Mining men and explosives experts in some quarters report, however, that results of experimental work with the shaped charge are inconclusive, and that powder can be made to do the same work as the shaped charge by conventional blasting methods, if used properly.

FOLDING SCRAPER. New design feature saves wear on scraper blade and permits scraper to adapt itself to variable loads. Blade is shown in folded position (at left) as the scraper is being hauled back over muck pile. Scraper hauls a big bite at right. Note that the pull rope slips through an eye on the front end of the bail, and is attached to clamp on top of folding blade.

TURNTABLE-MOUNTED HOIST is especially useful in irregular open stopes where muck must be scraped from faces extending in many directions from point where hoist is installed.

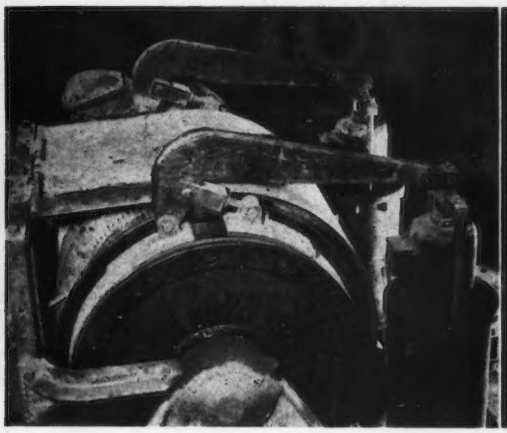
LOADING AND SCRAPING

UNDERGROUND LOADING TECHNIQUES in shaft-sinking, stopes, and development headings have advanced markedly. A demand for flexibility and mobility has influenced such developments as tractor-mounted equipment, two-way scraping, and loading from stopes with mucking machines. In many large mines, scraper loading is replacing chute loading. Truck haulage underground has brought about changes in the design of loading equipment. Coal-mining equipment first applied to non-metallics, is now being adapted to metal mines. Clamshell mucking equipment has proved completely successful in shaft-sinking operations.

OVERHEAD-MOUNTED HOIST installation designed for scraping in two slusher drifts in opposite directions. One machine does the work of two, and scraper is transferred quickly and easily.

LOADING SKIPS WITH TRENCH SCRAPERS. Six cars can be dumped at one time. Muck can be scraped directly into skip in shaft or into pocket leveled to hold exactly one skipload.

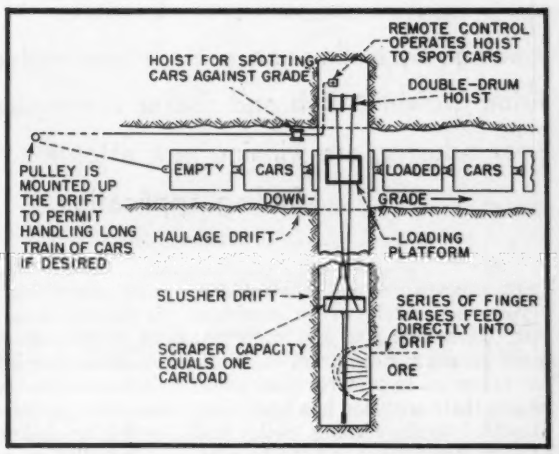
ANGLE SCRAPING is ideal for room-and-pillar mining systems. Ore can be scraped into a glory hole for chute loading; up ramps to load cars directly; or down raises, to be picked up by loaders in short mucking-machine drifts. Floodlights and remote control equipment can also be used to good advantage. Split-sheave design greatly simplifies installation of wire ropes for slushing.



REMOTE CONTROL. Operator, in center, stands at loading face and controls scraper hoist, at left, with small hand-held control unit.

FINGER-TIP CONTROL. Right, slight pressure of operator's finger causes compressed-air cylinder to operate slusher hoist brakes.

TURNTABLE LOADING RAMP. This steel unit can be used to scrape ore from inclined stopes as shown. It can also be hauled to a development face and turned 90 deg. to load mine cars.

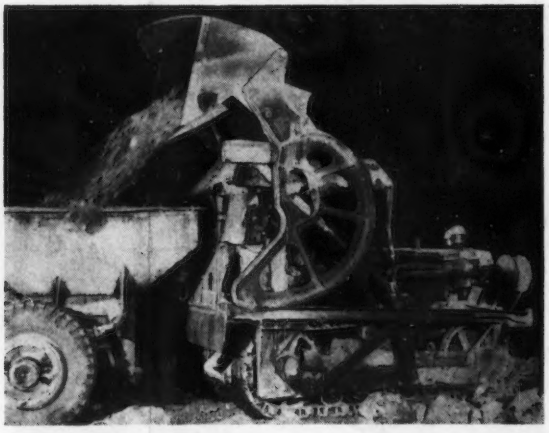


MEASURED LOADING AND REMOTE CONTROL for spotting mine cars are outstanding features of this ideal installation which could be modified to include two-way scraping from slusher drifts.

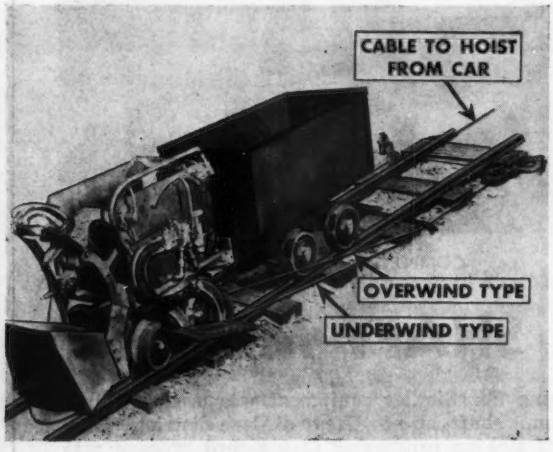
XUM

COAL MINING EQUIPMENT IN METAL MINES. Caterpillar-mounted loading machines like this were first tried with success in handling such non-metallics as gypsum, salt, potash, and bauxite. More recently, experiments have shown that the equipment can be used with equal success in metal mines. The unit above is shown loading potash ore into a cable-reel, eight-ton shuttle car.

TRACTOR-MOUNTED SHOVEL is powered by diesel engine, and used to load rubber-tired truck in large Tri-State lead-zinc mine.



TRACTOR-MOUNTED, DIESEL-POWERED LOADER handles large tonnage. Mobility and high lift are necessary for loading trucks.

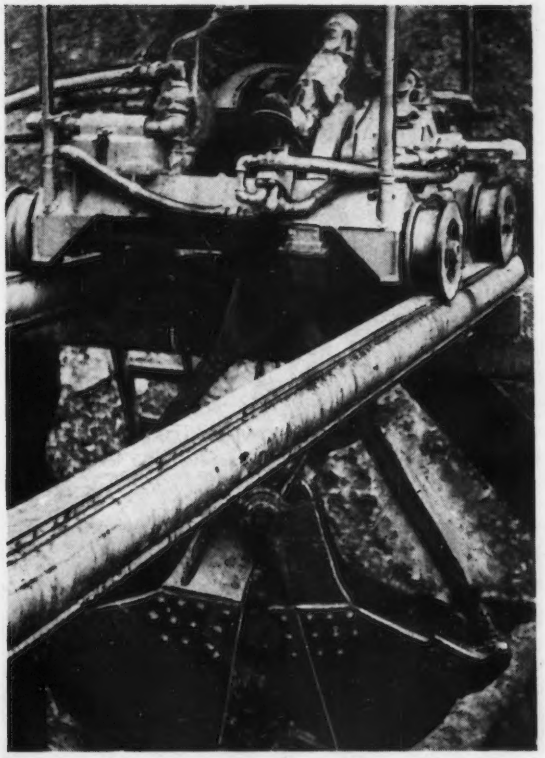


INCLINE MUCKING. Equipment like this was used to muck out a 23-deg. winze, with large savings in cost. The drum and cable attached to rear wheel control movement of mucking machine.

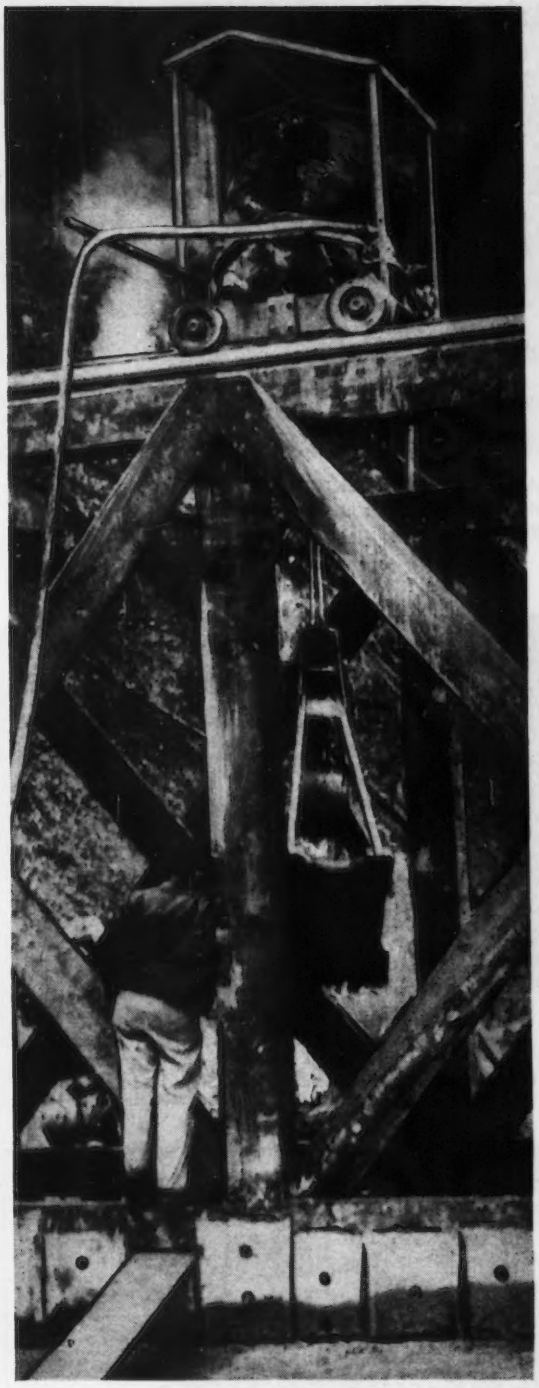
LOADING ORE DIRECTLY FROM STOPES with mucking machines on the haulage level has eliminated costly chute installations, and reduced attendant delays and dangers of secondary blasting.

XUM

AIR-OPERATED CARRIAGE



CLAMSHELL BUCKET



COMPLETE ASSEMBLY AT WORK

RIDDELL CLAMSHELL SHAFT MUCKER

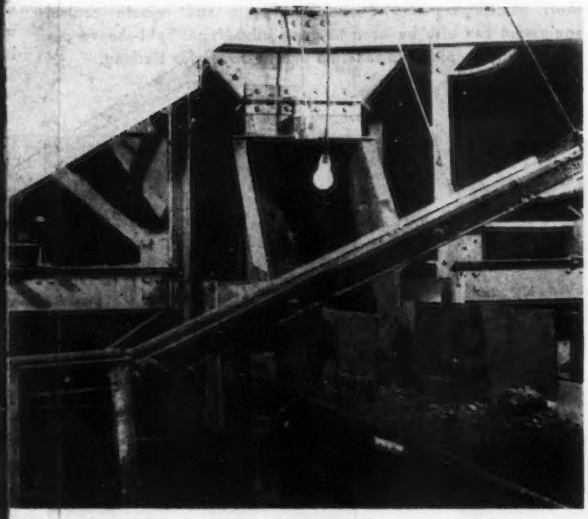
RECENT, REDESIGNED MODEL of Riddell clamshell shaft mucker is operated by one man who uses hand and foot levers to control movement of hoist and carriage, both of which are powered by compressed-air motors. Illustrations above show start of shaft sinking operations at Rock Creek property of Hecla Mining Co. Similar equipment was used at Silver Summit shaft, also in Coeur d'Alene district, where shaft sinking progressed at a record average rate for the district of 152 ft. per month. The carriage and track are lowered to new timber sets as shaft sinking advances.

XUM

LOADING the belt from shaker line, a continuing operation.

INSTALLATION was planned for this level from the start.

SHERWOOD MINE INSTALLS SHAKERS AND BELTS ON ONE LEVEL INSTEAD OF LOCOMOTIVES AND CARS



FROM TRANSFER POINT belt goes to shaft storage-pocket.

CONSTRUCTION is permanent, to handle large tonnage.

Mine Haulage in Evolution

Haulage by trolley and battery locomotives finds competition growing. Belt and shaker conveyors, much used in coal industry, are winning new attention. Diesel haulage finding application.

BELT CONVEYORS and shaker conveyors, separately or in combination, have long had an important place in coal mining practice. While not unknown in underground metal mines, their adoption has been slow. Standard haulage using trolley and battery locomotives is hard to beat, especially where already installed. Operators tend to be conservative and wait to see how others succeed with something different. A change is taking place, however, influenced by the success with belt conveyors in open-pit mining. Accompanying pictures show two outstanding belt conveyor installations, one of which is fed by shakers.

Installation of the Sullivan conveyor "hoist" (see top, page 107), was influenced by estimates that the cost of installing would be half that of sinking and equipping a shaft of equivalent capacity, and operating costs and horsepower requirements would be less. The inclined conveyor system was flexible and could be extended downward if needed. It handles 400 tons per hour. Six 100-hp. induction motors are used, one to a belt.

In contrast, the Sherwood system is on one level, having a total rise of only 6½ ft., and will take care of 200 tons per hour. It comprises two belt conveyors, one 818 ft. between pulley centers and the other 648 ft. Each takes 20 hp. a.c.

Shakers, with scrapers, find application in Miami Copper's block-caving system, because under part of the orebody the vertical interval between the haulage level and the

FROM LOADING POINT, 3400 level, conveyor lifts ore 680 ft.

A TRANSFER POINT, on 3900 level, one of several on incline.

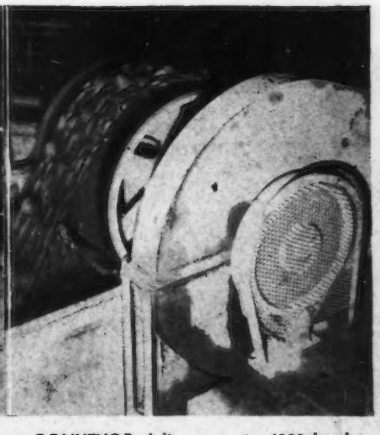
SULLIVAN MINE'S CONVEYOR SYSTEM, 2,496 FT. LONG, HOISTS AS WELL AS CONVEYS, SAVED SINKING NEW SHAFT

bottom of the ore is too small to permit installing branch transfer raises. Hence shakers provide lateral transport for a quarter of the tonnage, scrapers for another quarter. The balance is handled by the gravity system.

Distance from drawpoint to transfer raise varies from 32 ft. to 165 ft. Monthly average tonnage per shaker line is 200 per 8-hr. shift. All shaker units in service are 15-hp. Future machines will be 20-hp. Each line is serviced by two men, one pulling chutes and the other keeping the grizzly clean. These men actually spend 6½ hr. out of each 8-hr. shift in stope.

(*Continued on next page*)

CONTROL STATION of conveyor system.



CONVEYOR delivers ore to 4000 level.

SHAKERS, SCRAPERS, AND STANDARD HAULAGE DIVIDE TASK OF HANDLING ORE FROM MIAMI COPPER'S STOPES

FOUR JACKS support shaker drive.

SHAKER DRIVE is in pit behind grizzly.

LOADING SHAKER from a stope.

TROLLEY PHONE PERMITS TALK BETWEEN MOTORMAN AND SHIFT BOSS OR DISPATCHER OR OTHER MOTORMEN

FOR SAFETY IN HAULAGE—To start locomotive, motorman must be seated with foot on switch. Safety interlock is seen beneath controller of locomotive at the right.

Running counter to the ideas of most operators in the past, diesel power is being used for haulage underground. The instances here are few as yet, though numerous abroad. A vital condition is that ventilation must be good. As means for conditioning the exhaust gases improve, application is expected to widen.

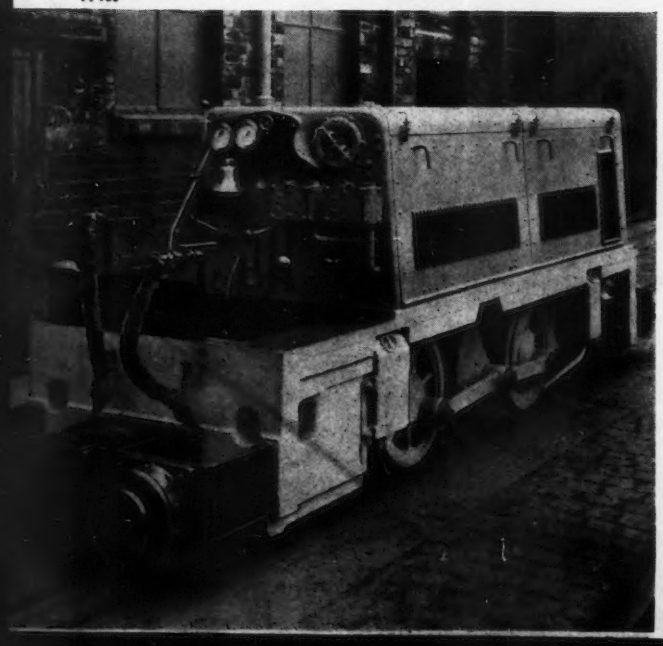
Trackless mining underground with rubber-tired haulage has found acceptance in mining various nonmetallics. Hopes are pinned on a recent installation made at an iron mine in the Birmingham district. The rubber-tired utility car shown on opposite page can become indispensable.

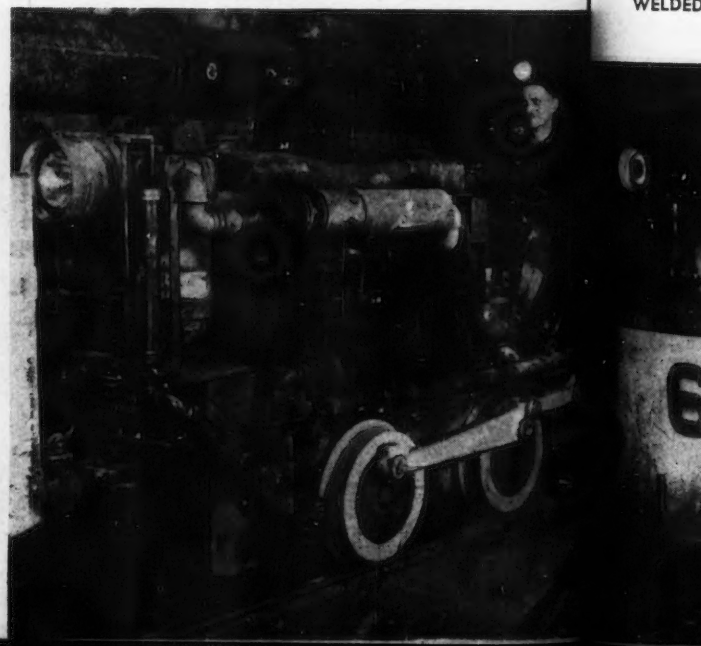
Greater safety in haulage is the objective of the ingenuity displayed in various pictures. Note the use

DIESEL HAULAGE HAS BEEN SHOWN TO BE SUITABLE FOR USE UNDERGROUND WHERE VENTILATION IS GOOD

BRITISH DIESEL locomotive made for coal mining.

DIESEL LOCOMOTIVE in Treasury tunnel.





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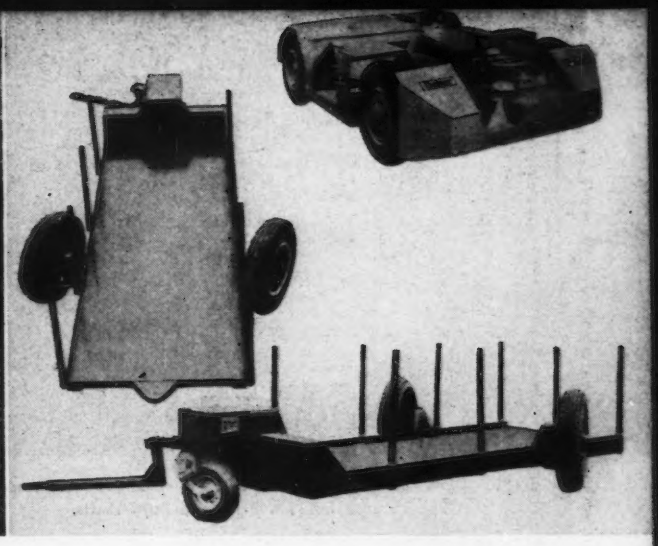
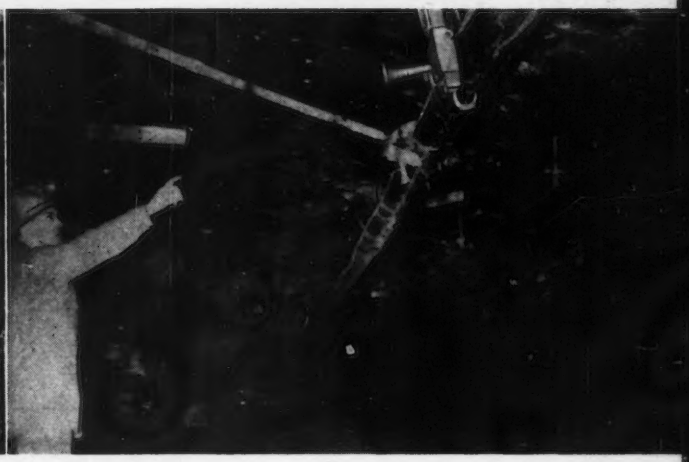


SHUTTLE CAR receiving load of ore. UTILITY CAR, upper right. Timber truck, below.

RUBBER-TIRED SHUTTLE CARS EXEMPLIFY UNDERGROUND TRACKLESS MINING

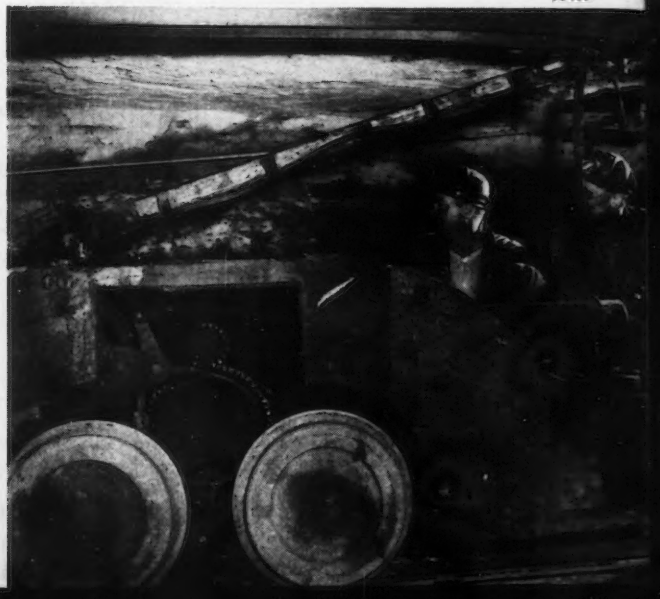


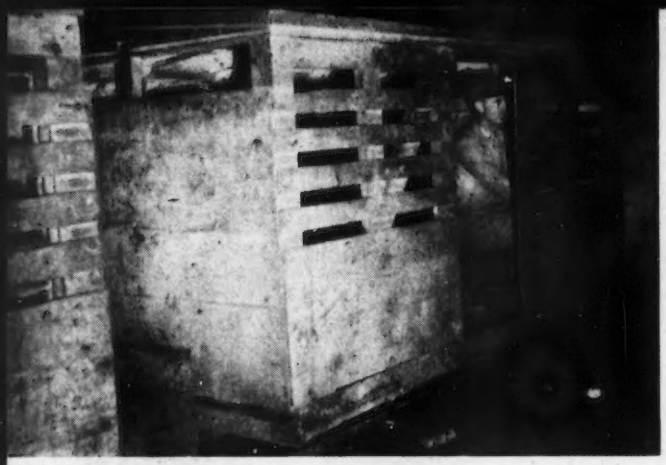
LIGHT BEAM spanning drift is cut by passing train. SIGNAL HORN sounds at junction when light beam is cut.

FOR HAULAGE SAFETY—ELECTRIC EYE IN HAULAGEWAY SOUNDS WARNING AT JUNCTION. HANNA'S HOMER MINE

WELDED DASHBOARD and cab lengthened by 6 in. make Tennessee Copper motorman safer and more comfortable.

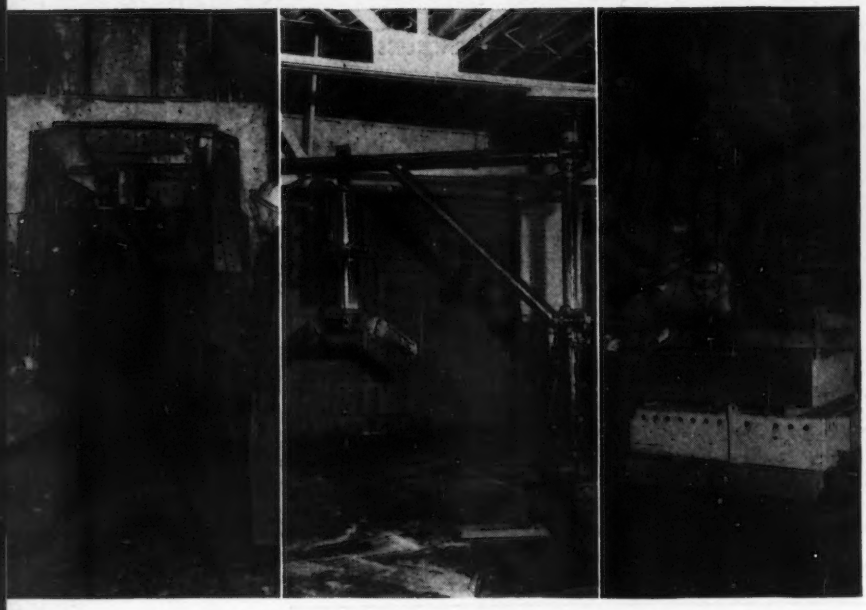
TROLLEY GUARD, of flexible, flame- and acid-resistant material, withstands 20,000 volts, hangs better, protects pole.





SAFE, COMFORTABLE TRANSPORT is provided Tennessee Copper's crew between Burra and Boyd shafts.

STORAGE BATTERY is quickly removed for charging, by aid of this ramp and rollers. (Also Tennessee Copper Co.)



"CHERRY PICKERS" PROVIDE A SIMPLE MEANS OF "SWITCHING" MUCK CARS.

ONE AT RIGHT is being used for shifting storage battery after charging.

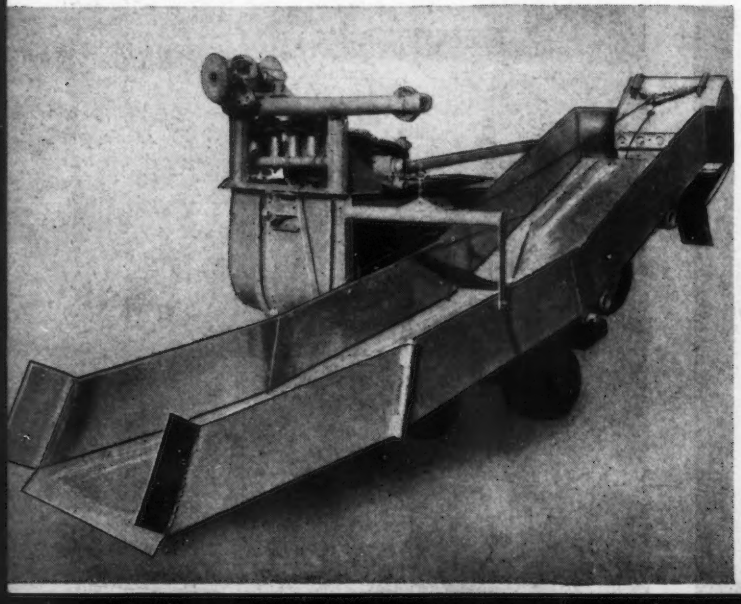
POWDER-POWERED rail punch.

of the electric eye on preceding page, the new trolley guard below it, and the improved cab for mine locomotives at the right. The covered, comfortable transport for men illustrated at top of this page is especially worthy of note.

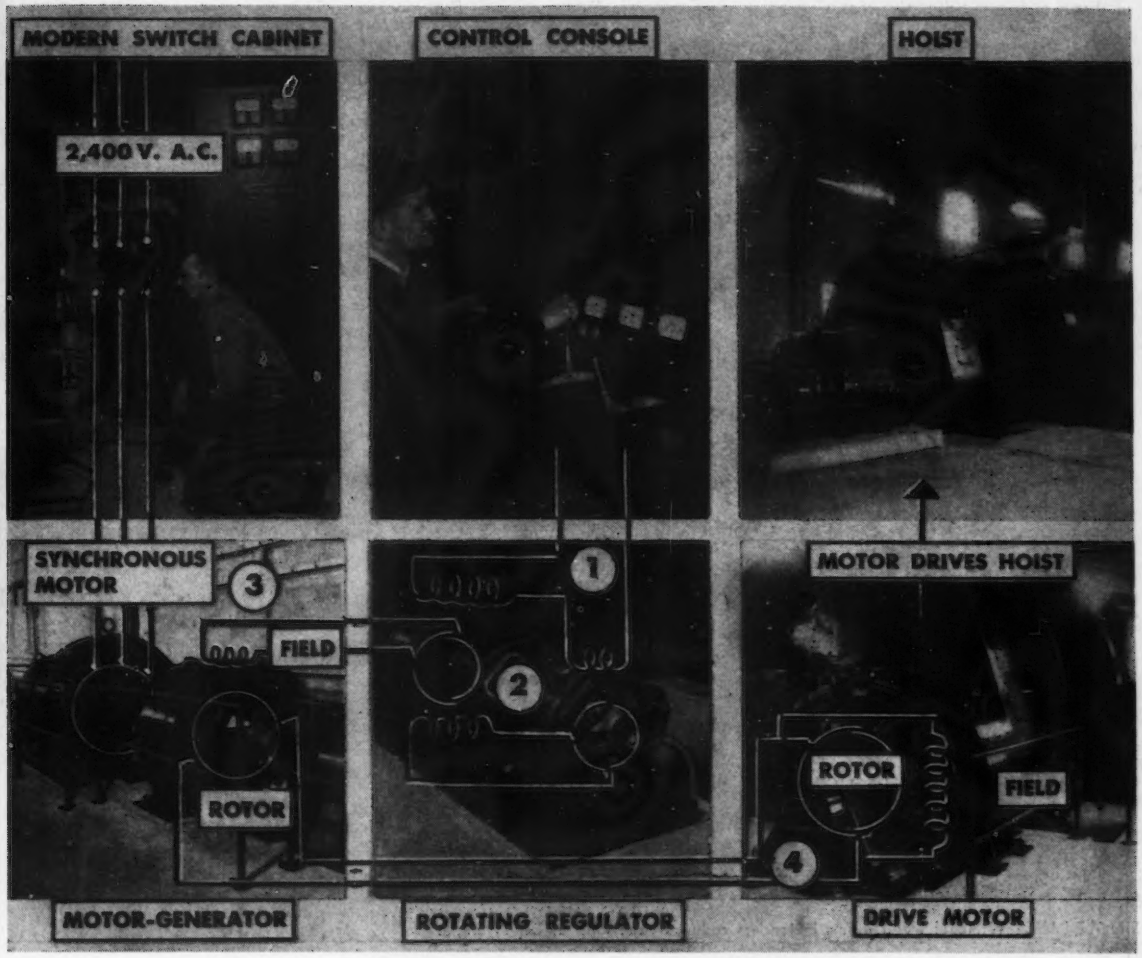
Ditch cleaning underground has long been a nuisance. The machine for doing it, bottom at left, will be welcomed in many mines.

MACHINE FOR CLEANING haulageway ditches meets long-time need.

P. 110



SPRING MOUNTING gives clean dumping.

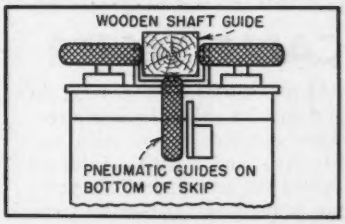


MODERN CONTROLS obey a hoistman if he's right, but correct his errors automatically. Small current controlled at console (1) energizes small generators (2) which energize large generator (3) supplying current to hoist motor (4).

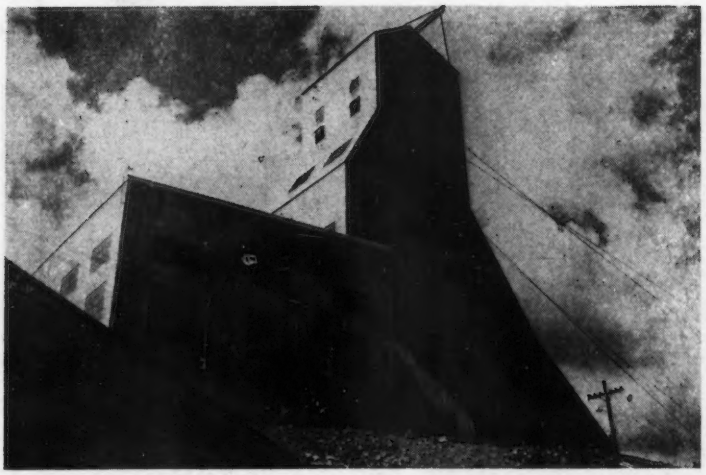
HOISTING

CONSIDER these design features in planning your up-to-date installation: (1) Single-layer winding. This cuts down rope wear. Higher first costs may be offset by lower operating costs. (2) Full automatic controls. These have been used for more than 30 years, but are receiving renewed consideration. (3) Semi-automatic controls prevent burned-out motors, overspeed, overtravel, and wasted power. (4) Multiple-tooth clutches. Most new hoists have them because they are safer. (5) Rubber-tired skip guides stop wooden guide wear. (6) Cage-to-hoistman communication systems permit giving instructions while cage is in travel. (7) Elevators in headframes and stope pillars save time and effort. (8) Aluminum cages for lightness.

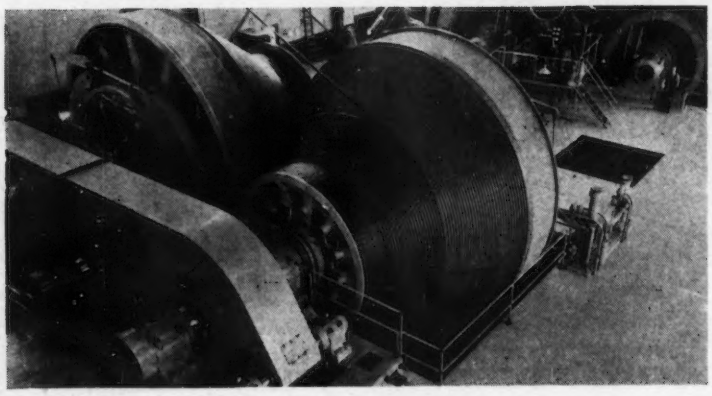
ALL-ALUMINUM CAGE. Dead weight in hoisting equipment is an important power cost factor. New aluminum alloys now permit construction of strong, light, equipment like this for mine shaft installations.



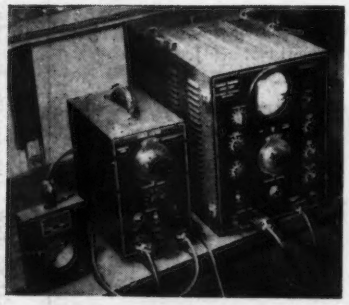
RUBBER-TIRED SKIP GUIDES have virtually eliminated wear on expensive wooden guides at one mine. Twelve pneumatic wheels are attached to each skip as shown. Smooth travel of skip and cage is insured.



NO IDLER TOWERS were needed in this installation because . . .



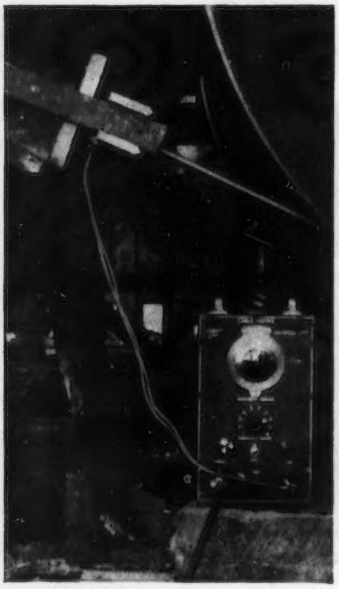
SINGLE-LAYER WINDING and drums in tandem reduced rope whip and fleet angle.



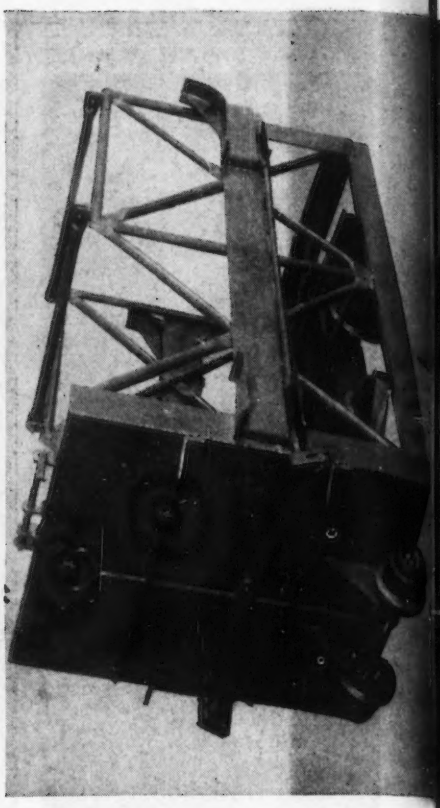
EQUIPMENT consists of main unit, at right, remote unit, in center, and test coil.

CABLE TESTER

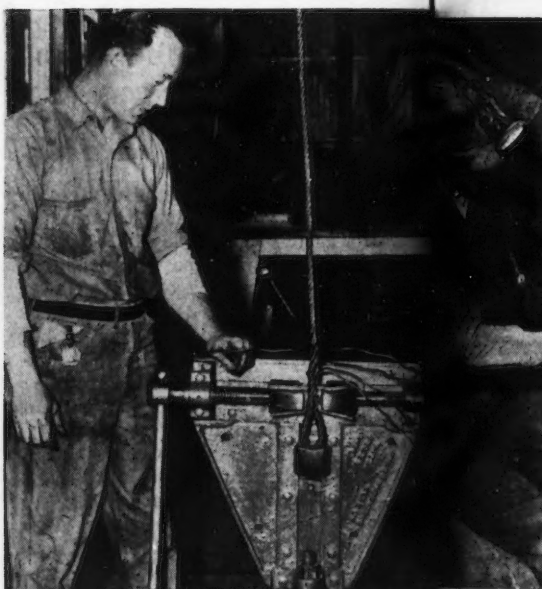
ENERGY ABSORBED by a body in the field of a coil carrying alternating current varies with the material and with internal stresses and structure. This principle is used in the DuMont cyclograph for testing stresses and conditions of hoisting ropes. Encouraging results were obtained in experiments by the General Engineering Co., of Toronto.



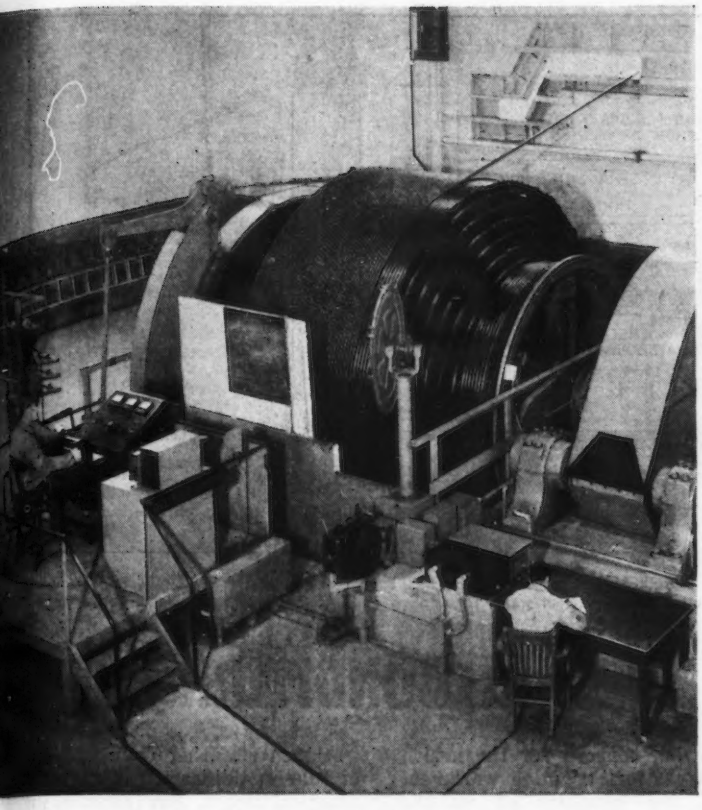
CABLE TESTER mounted near sheave wheel. The testing coil encircles the hoist rope within the wooden blocking, and is connected to the remote unit.



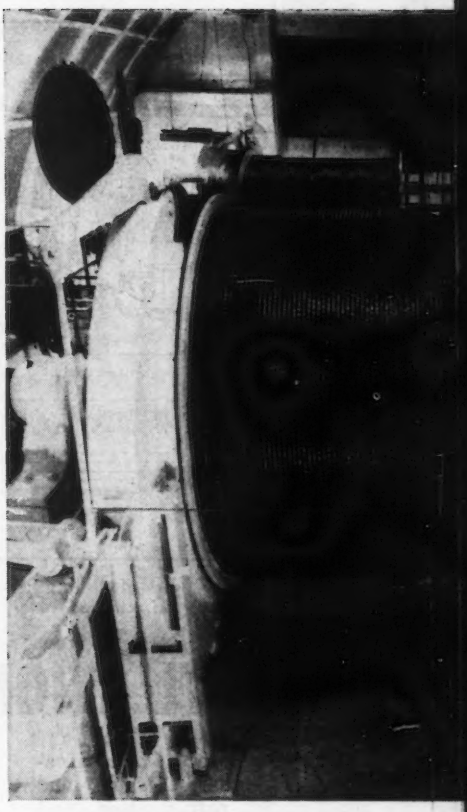
SUPPLY CAR shown above as it appears in shaft. Handle controls lock on guide shoe. Wheels permit unit to be swung out of shaft and serve as timber and supply car.



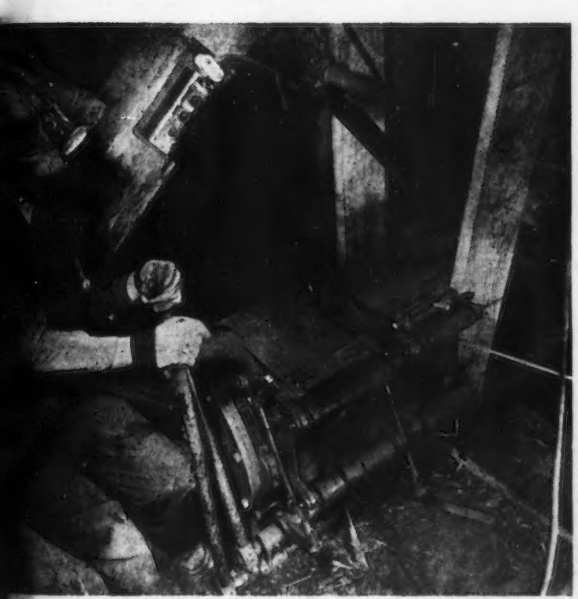
MANY SECOND USES can be made of preformed hoist ropes after they have been retired from service because they remain smooth. They are good for scraper operations.



DESIGNED FOR SPEED. This recently installed bi-cylindro, conical-balanced single-drum hoist raises 10 tons of rock every 120 seconds from operations 2,200 ft. below the surface. It is equipped with a 125-hp., 400-r.p.m., d.c. motor. Speed and acceleration are controlled automatically by a group of small regulating generators.



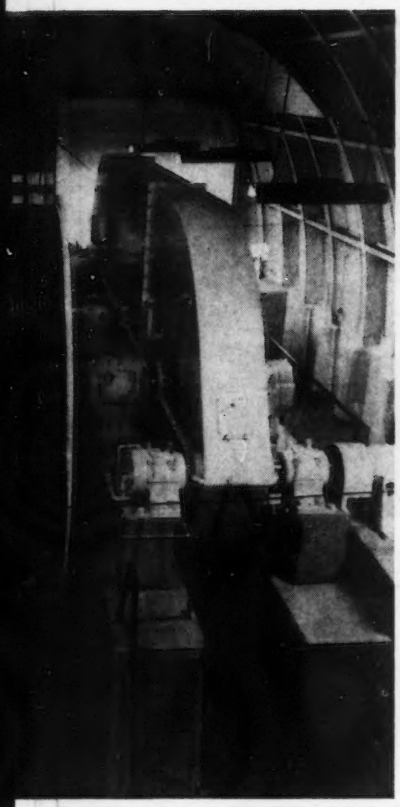
DESIGNED FOR COMPACTNESS. This 12-ft. dia. hoist installed with drums in tandem to cut down fleet angle. which amplifies small signal currents at the console, and motor. Signal currents require only a small controller.



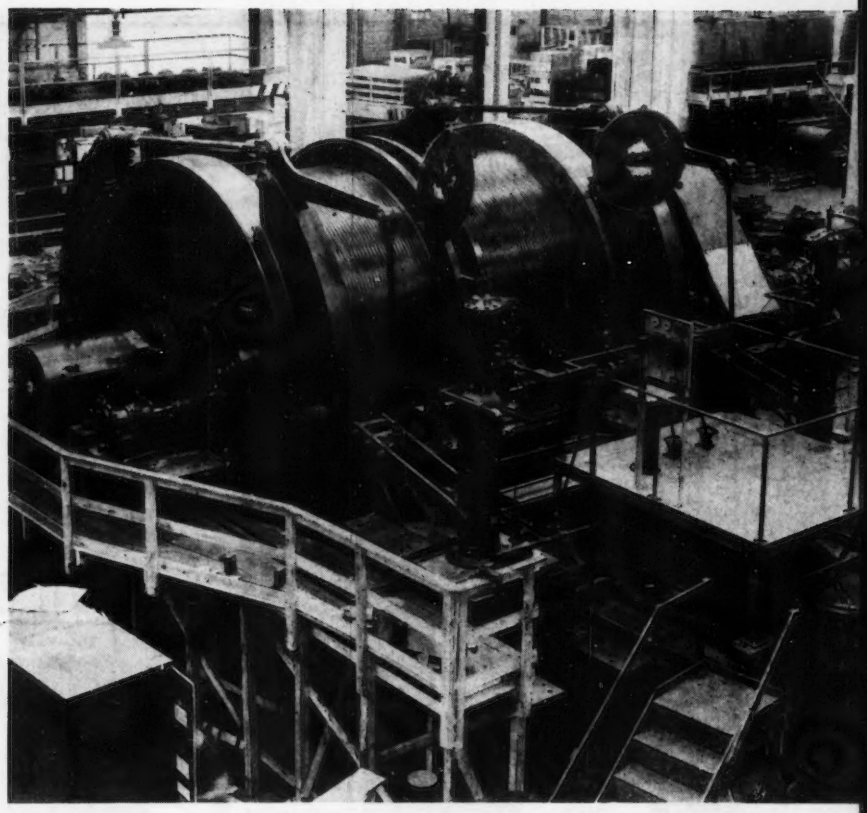
MULTI-PURPOSE HOIST. Equipped with two-speed, push-button control, this hoist can be used to hoist timber and supplies up a raise; turned on a pivot to skid materials to a working face; and finally hooked up to slush out a drift round.

REMOTE CONTROL on double-drum, 25-hp., a.c. hoist permits operator to stand where he can observe load being handled. Thrustors operate the clutch, and brakes are of the automatic bored type.

SMALL UT
posts or ca
heavy wor
Timbermen



hoistwas hauled underground in sections, and
angleHoist is controlled by a small generator
, andmpresses them upon control fields of the
ller. lany points of control may be obtained.

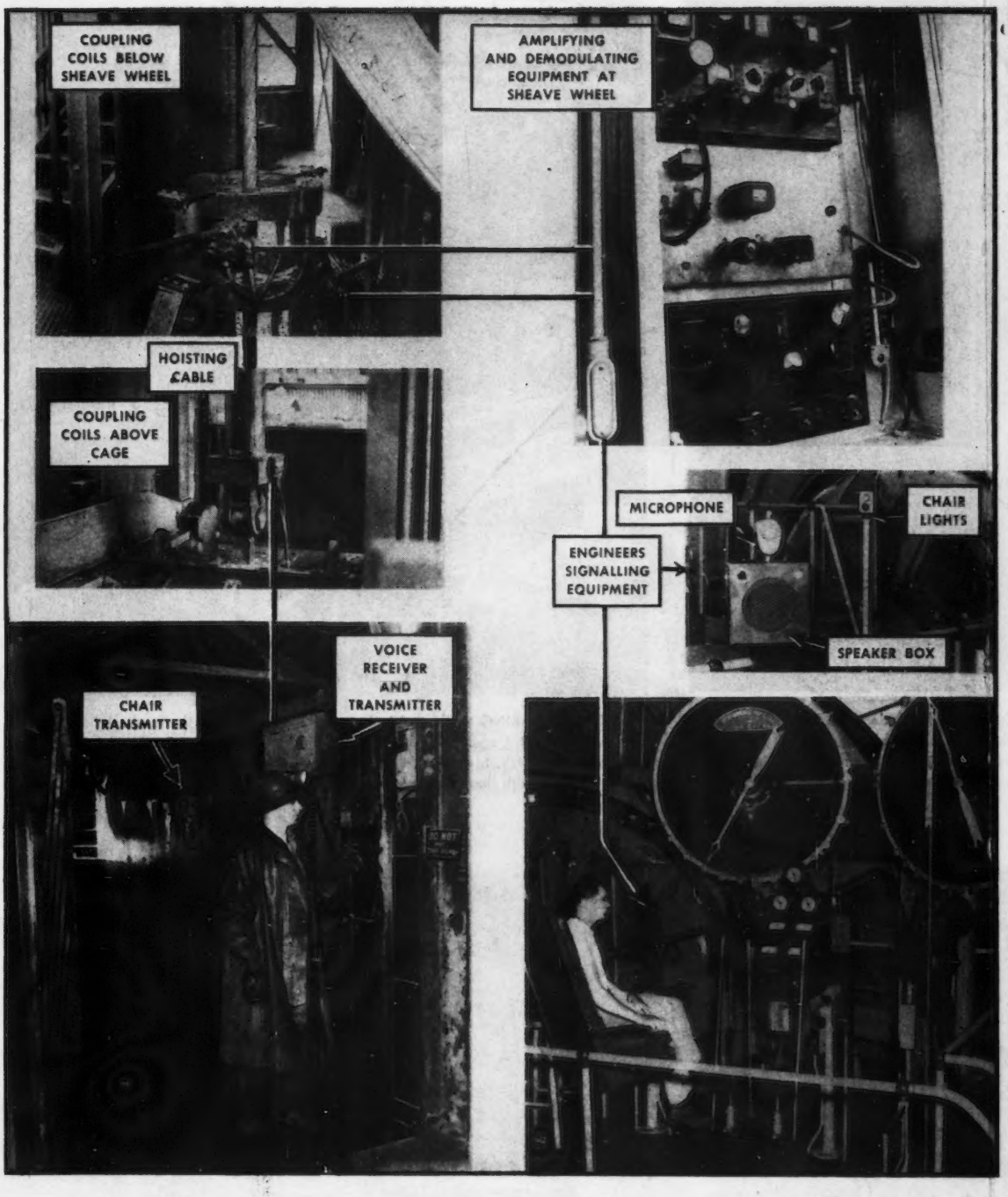


NO CENTER BEARING on this hist. A smaller fleet angle was the result. A heavier shaft was required, but increased cost was offset by omission of center bearing. Note also multiple-tooth clutch. More than 80% of hoists purchased in recent years are equipped with these because of positive assurance against slipping.

L UTILITY HOISTS mounted on convenient
or columns can be made to do much of the
work underground if properly rigged up.
rmen and repair crews will find them useful.

PUSH-BUTTON ELEVATORS are becoming increasingly popular underground for stope pillars and man hoists. Time and effort formerly used for climbing can now be used to drill and blast. When installed in lofty headframes like the one shown above, workmen will be induced to do maintenance jobs more thoroughly and regularly.

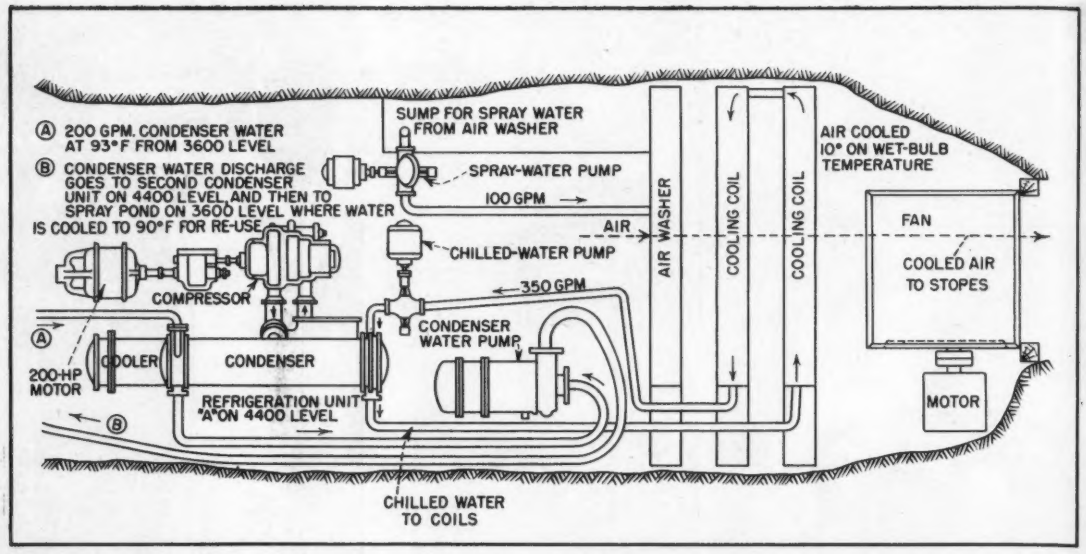
XUM



TWO-WAY SHAFT COMMUNICATION

In the shaft communication system at the Homestake Mining Co., the hoisting rope is used to carry a fundamental frequency which can be modulated for voice transmission with the equipment shown above. As a result of more than ten years experiment and improvement, this system now permits free communication between hoisting engineer and cager. Instructions may be given to the hoistman while the cage is in motion. When a cage is to be landed on chairs, the cager announces this during descent, and calls "On chairs" when the cage is about five feet above its destination. The hoistman slows the cage sufficiently to permit the cager to manually operate the chairs, so that the cage can be lowered gently on the chairs. A red chair light (see illustration) indicates when the chairs are extended, so that the hoisting engineer can govern his motions accordingly. Carrier current is also used to operate the chair-light system. Members of the Homestake staff report that first cost of the carrier current signal system is much less than that of conventional wiring systems.

XUM


Ⓐ 200 GPM. CONDENSER WATER AT 93°F FROM 3600 LEVEL
Ⓑ CONDENSER WATER DISCHARGE GOES TO SECOND CONDENSER UNIT ON 4400 LEVEL AND THEN TO SPRAY POND ON 3600 LEVEL WHERE WATER IS COOLED TO 90°F FOR RE-USE
SUMP FOR SPRAY WATER FROM AIR WASHER
SPRAY-WATER PUMP
100 GPM
AIR
CHILLED-WATER PUMP
350 GPM
CONDENSER WATER PUMP
COMPRESSOR
COOLER
CONDENSER
200-HP MOTOR
REFRIGERATION UNIT "A" ON 4400 LEVEL
AIR WASHER
COOLING COIL
COOLING COIL
AIR COOLED 10° ON WET-BULB TEMPERATURE
FAN
COOLED AIR TO STOPES
MOTOR
CHILLED WATER TO COILS

PRESENT COOLING SYSTEM at Magma Copper Co., Superior, Ariz., employs six refrigeration units like the one shown above. Each unit requires 200 g.p.m. of condenser water, and cools 350 g.p.m. of water for cooling coils. See photographs on opposite page.

VENTILATION AND AIR CONDITIONING

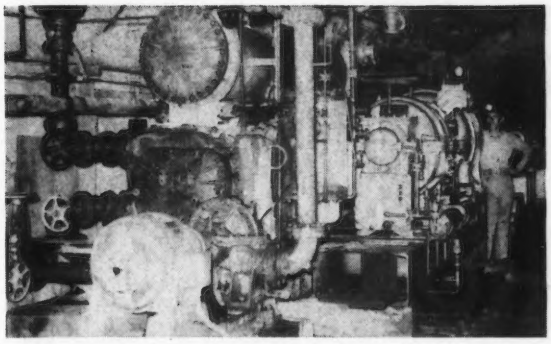
DUST CONTROL, de-humidification, aluminum therapy, and cooling by refrigeration and evaporation are phases of ventilation receiving increased attention. This action is spurred by a growing concern for the health and comfort of mine workmen, and the necessity of making mining more attractive to labor to prevent migration to other occupations. Improved efficiency of workmen resulting from cooling and de-humidification is another practical aspect. For instance, in deep mines in the Kolar gold field of India, efficiency of workmen increased 25 to 100 percent, and accident rates fell 30 percent as a direct result of cooling systems. Cooling also favored the flow of air through the workings to the extent that power saved in fans and boosters approximately equalled that used to cool the air. The Ooregum mine in the Kolar field, 9,200 ft. deep, runs entirely on natural ventilation as a result of its cooling system.

TWO METHODS of administering aluminum therapy. Individual treatment shown at left, and change-house treatment at right.

Because of rapidly changing conditions in most mines, auxiliary ventilation methods are also being modernized. Rigid and flexible ventilation tubing is now available to meet any conditions encountered in mines, and small fan designs have undergone constant improvement. Spot coolers have proved effective for local hot spots.

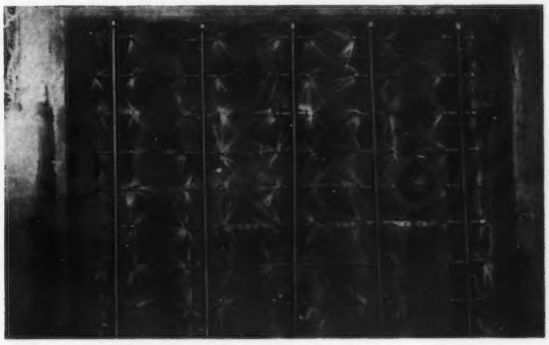
In addition to conventional dust control methods, aluminum therapy is receiving world-wide recognition as a means of inhibiting or preventing silicosis. The technique of administering the aluminum dust has undergone considerable refinement in recent years, and strong efforts are being made to assess the benefits of the treatments.

SPOT COOLERS dehumidify and cool air in hot working areas underground.



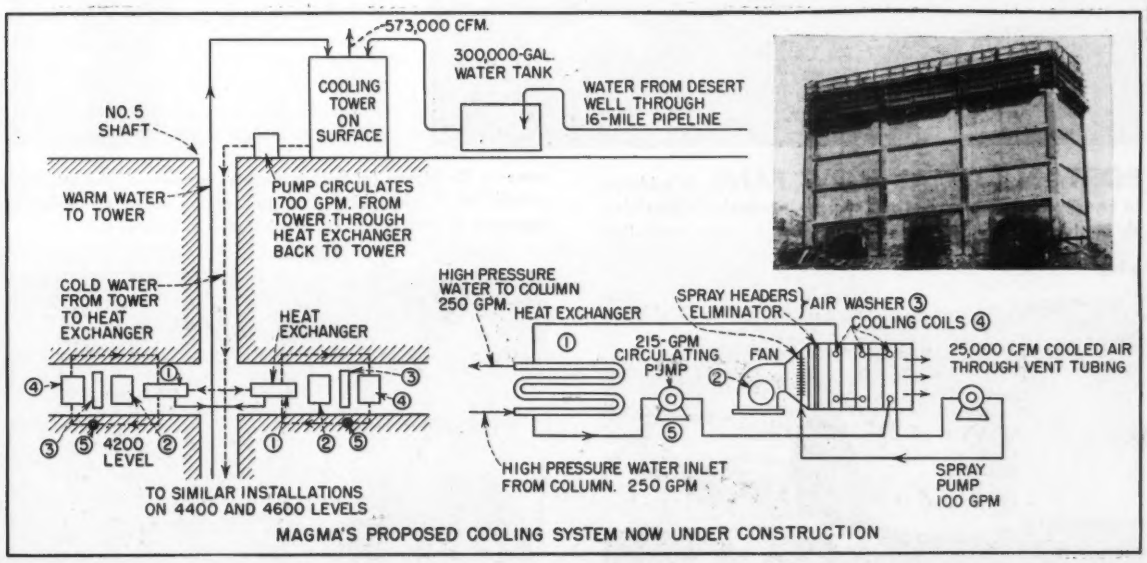
1 REFRIGERATION UNITS at Magma consist of compressor, condenser, and cooler, each powered by a 200-hp. motor.

2 MOTOR DRIVES HIGH-SPEED FAN which is used to circulate hot mine air through aerofin cooling coils.



3 WATER SPRAYS on ingoing side of air washer. Washed air is then drawn through aerofin cooling coils.

4 CHILLED WATER from cooling plant circulates through copper coils which cool 30,000 c.f.m. 10 deg. F. on wet bulb.

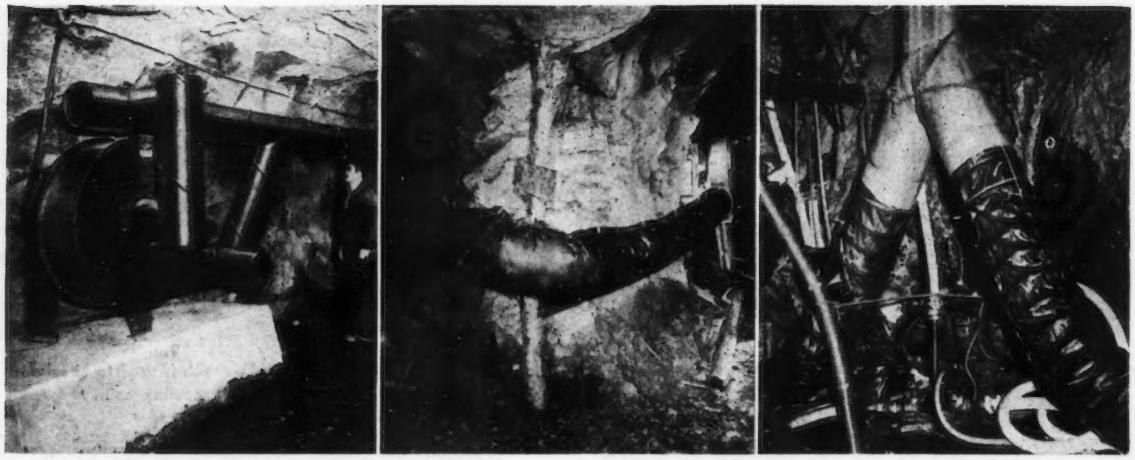

573,000 CFM.
300,000-GAL. WATER TANK
COOLING TOWER ON SURFACE
WATER FROM DESERT WELL THROUGH 16-MILE PIPELINE
NO. 5 SHAFT
WARM WATER TO TOWER
PUMP CIRCULATES 1700 GPM. FROM TOWER THROUGH HEAT EXCHANGER BACK TO TOWER
COLD WATER FROM TOWER TO HEAT EXCHANGER
HEAT EXCHANGER
4200 LEVEL
TO SIMILAR INSTALLATIONS ON 4400 AND 4600 LEVELS
HIGH PRESSURE WATER TO COLUMN 250 GPM.
HEAT EXCHANGER
SPRAY HEADERS
ELIMINATOR
AIR WASHER ③
COOLING COILS ④
215-GPM CIRCULATING PUMP
FAN
25,000 CFM COOLED AIR THROUGH VENT TUBING
HIGH PRESSURE WATER INLET FROM COLUMN. 250 GPM
SPRAY PUMP 100 GPM

MAGMA'S PROPOSED COOLING SYSTEM NOW UNDER CONSTRUCTION

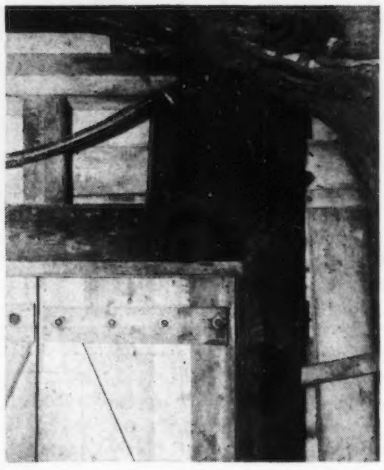
NEW COOLING SYSTEM

at Magma, now being completed. Units at top of page will be moved for continued use at No. 3 shaft. New cooling tower, nearing completion, is shown at upper right.

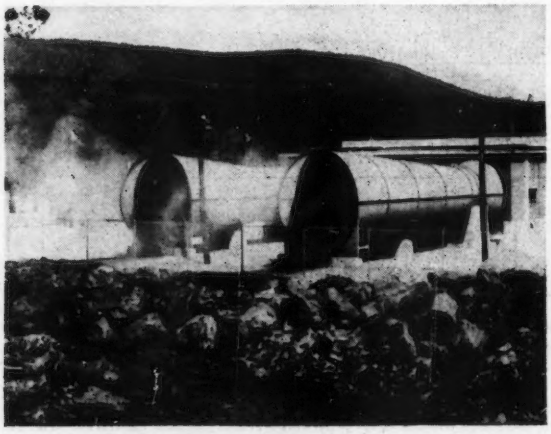
NEW TOWER is designed to cool 1,720 g.p.m. of water from 85 deg. F. to 62 deg. F., when air entering tower precooler coils is 100 deg. dry bulb, and 70 deg. wet bulb. Approximately 573,000 c.f.m. of air will be drawn through the precooler coils and discharged at the top of the tower. Approximately 1,650 g.p.m. of water will circulate through the precool coils and go to the top of the tower with 1,720 g.p.m. of mine water which has been heated in the heat exchangers underground. The 573,000 c.f.m of air is precooled before entering the tower. Illustrations, courtesy G. L. Augustadt, ventilation engineer at Magma.

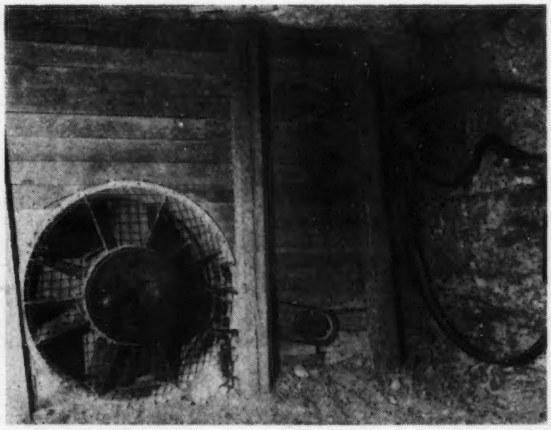


AUXILIARY VENTILATION Push - pull arrangement with rigid pipe and centrifugal blower (at left) is ideal for tunnel work. Flexible and reinforced tubing (at center and right) are suited to rapidly advancing stopes and development faces.

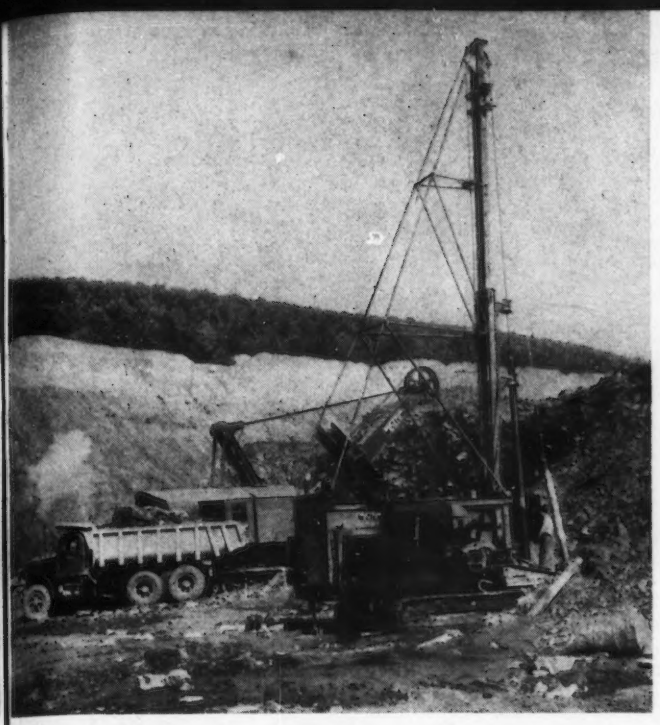


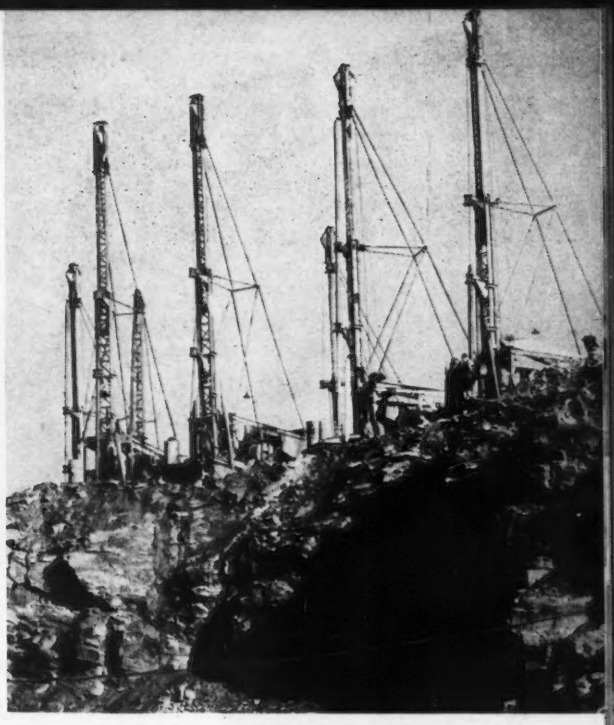
PORTABLE AXIAL-FLOW FANS, in addition to centrifugal types shown at top of page, are useful in supplying air to stopes and working faces not reached by main ventilation currents. The blower (at left) is electrically powered, and attached directly to flexible tubing. The auxiliary fan shown (at right) is operated by compressed air, and installed as booster fan.





PARALLEL INSTALLATION of adjustable - pitch, axial-flow fans (at left) has these advantages: (1) Increased flexibility in range of operation, (2) in case of shut-down, one fan can supply 70% of the total volume, (3) smaller units have greater resale possibilities, because they can be adapted to more varied installations. Large axial-flow fan (at right) is installed underground.





LARGER CHURN DRILLS, for blast holes up to 9 in. and more in diameter, give greater efficiency in breaking ground.

Open-Cut Mining

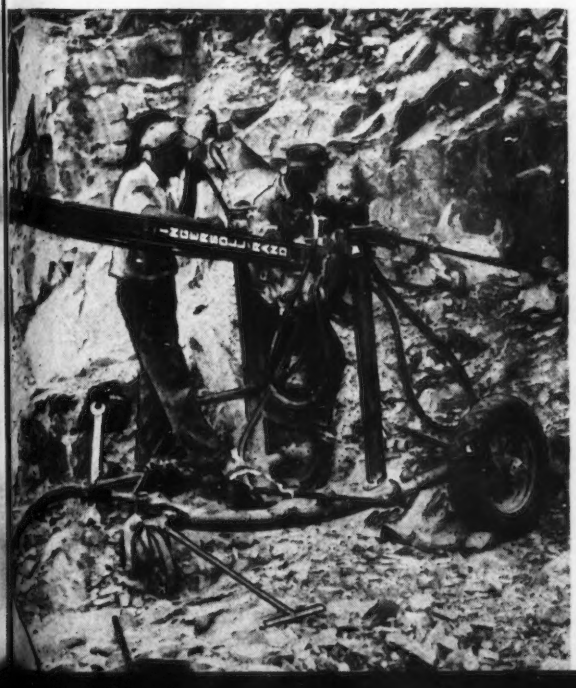
Drilling. Churn drills today must meet increasing competition. Diamond drills did notable work in the Steep Rock area, Ontario. A caterpillar-mounted piston drill capable of drilling 6-in. and larger holes rapidly has drawn attention.

The crawler-mounted compressor (p. 120) is not only a 60-cu. ft. machine but also a small tractor and power tractor combined, power being derived from the compressor engine. Power can be taken off to run a pump, a circular saw, or other equipment.

New things in blasting practice include the use of detonators having split-second delay intervals in a procedure that gives better fragmentation, reduced secondary blasting, and less noise and vibration. A blasting timer (p. 121), to get the same result, is shown. With it a series of charges can be fired at predetermined intervals as short as five-thousandths of a second.

(Continued on next page)

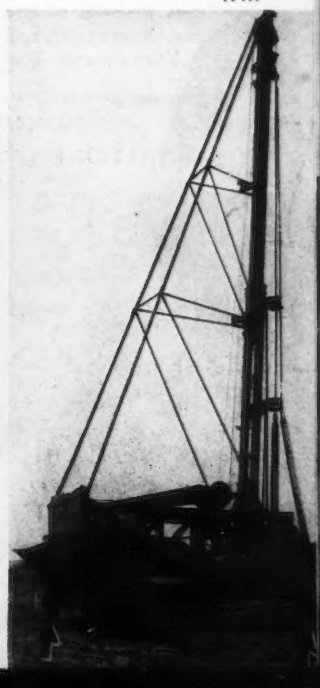
WAGON DRILL (4-in. drifter) drilling 24-ft. holes in hard trap with tungsten-carbide detachable bits.



STEEL CAB protects against weather.

BUILT-IN JACKS (arrows) for quick leveling.

P. 119

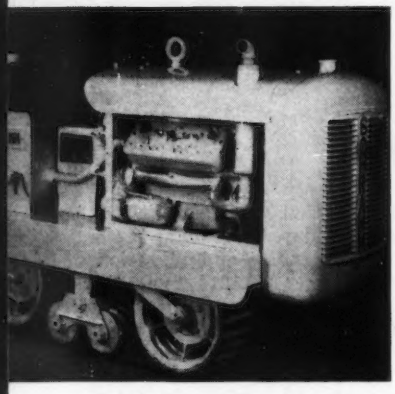


XUM

HORIZONTAL DRILL handles 4-in. to 12-in. augers up to 150 ft.

TRUCK-MOUNTING improves drill's usefulness.

MOBILE ROCK-BORING MACHINE COMES IN HORIZONTAL AND VERTICAL TYPES



Compressor is crawler-mounted. It is also a small power plant.

The vertical-type of rock-boring machine is readily moved.

An easily-held jackhammer.

No shooting needed.

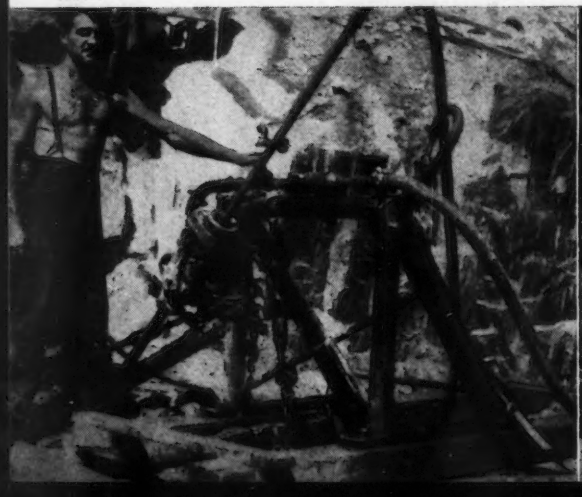
Related to fusion piercing, interesting developments are reported under way which, if successful, will provide a new method of producing secondary reduction, or breaking, in open-pit mining. See p. 121.

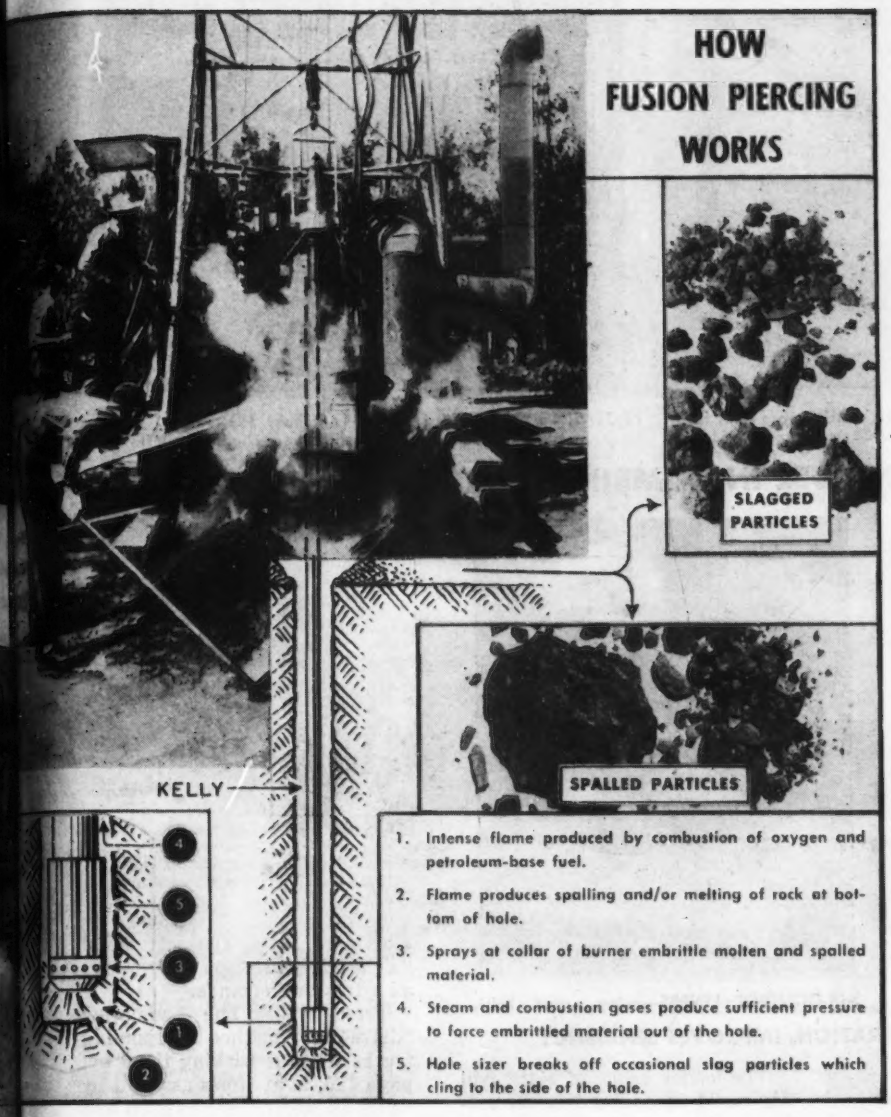
Excavators. The big dragline, p. 122, typifies a current

DIAMOND DRILLS COMPETED EFFECTIVELY WITH CHURN DRILLS ON STEEP ROCK DIVERSION JOB.

BOYLES BROS. RIG drilling east toe, Raft Lake cut.

DRILLING from tunnel and surface gave unusual results.




HOW FUSION PIERCING WORKS
SLAGGED PARTICLES
SPALLED PARTICLES
KELLY
1. Intense flame produced by combustion of oxygen and petroleum-base fuel.
2. Flame produces spalling and/or melting of rock at bottom of hole.
3. Sprays at collar of burner embrittle molten and spalled material.
4. Steam and combustion gases produce sufficient pressure to force embrittled material out of the hole.
5. Hole sizer breaks off occasional slag particles which cling to the side of the hole.

trend to the walking type, which has superior ability to work where footing is soft. Rated (bucket) capacity varies according to boom length. A light-alloy dragline boom is in phosphate service.

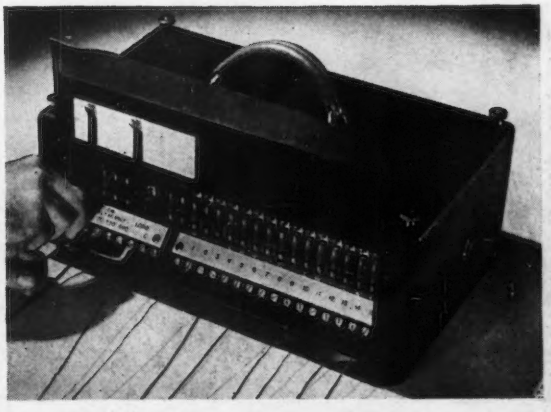
The big bucket shown (p. 123) has austenitic manganese nickel steel in dipper lips and shells to reduce weight while maintaining strength and durability. Ni-Cr-Mo steel is used for highly-stressed, forged parts, and a Ni-Va cast steel for crawler axles, pinions, gears and other parts. Dippers ½ to 2 cu. yd. in capacity are made in two pieces, comprising a front and a back section. From 2 cu. yd. and up, the dipper has four pieces, a front, a back, and 2 side sections. Teeth are reversible, replaceable, and fanned to give a scoop-like effect.

In contrast with rotating control, another shovel builder makes use of magnetic-torque control. The unit has an outer member with a field coil and an inner one without it. The outer is driven at constant speed by the hoist motor. By controlling the field-coil current, the torque transmitted to the inner member is also controlled. It increases as digging gets tougher, reaches a maximum when the dipper stalls. See p. 124.

In the diesel shovel mentioned as having an electrically-operated swing, the diesel engine drives a generator (for the swing) as well as the clutch-actuated movements.

FUSION PIERCING provides new way of putting down blast holes from surface at unprecedented rate

LIGHT EXPERIMENTAL MODEL mounted on wagon-drill rig suitable for piercing holes at any angle in open-pit work.



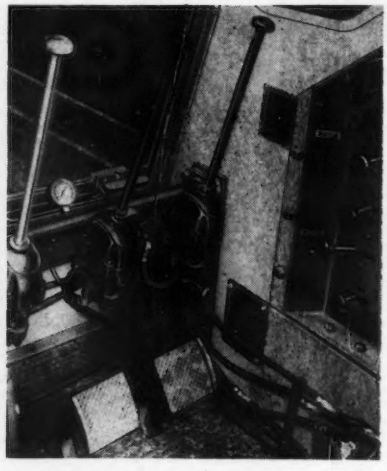
BLASTING TIMER reduces vibration, breaks better, by firing charges in series at pre-determined intervals.

GREAT RANGE in digging and dumping. Walking type finds favor for surer footing. International Min. & Chem. Corp., Florida.

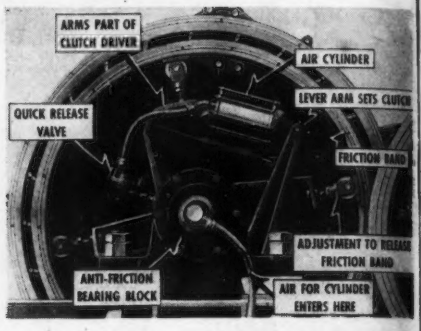
ROTATING CONTROL for drag (A), hoist (B), swing (C) gives easy, quick delicate control of "Bigger Digger" at left.

BIG DRAGLINES FIND USE IN COMBINED STRIPPING AND MINING

OPERATION is controlled by air.

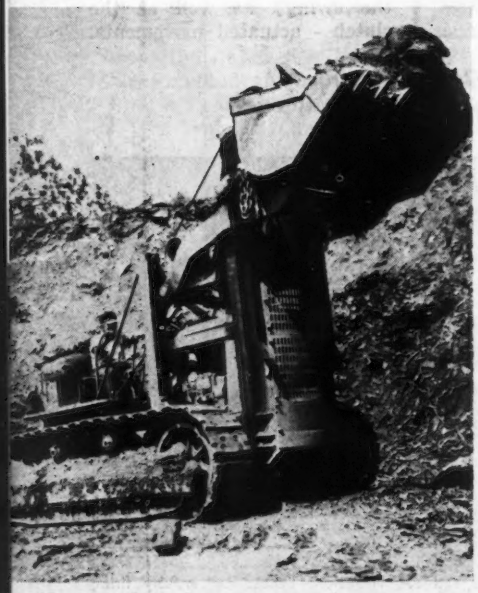


AIR-CONTROL LEVERS—swing, crowd, hoist.



AIR CONTROL is applied to clutch as indicated here, in machine at left.

AIR CONTROL EASES OPERATION, IMPROVES EFFICIENCY



THIS EXCAVATOR transports as well as digs.

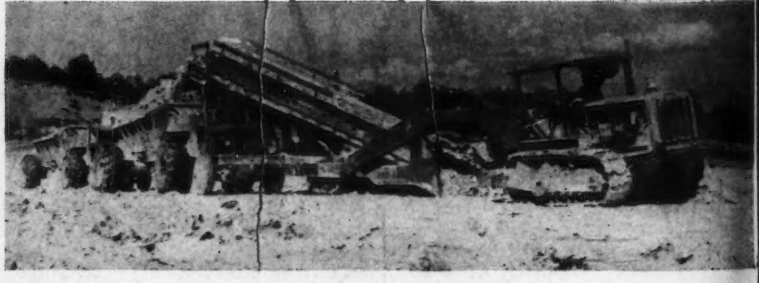
The loader below at right will dig to 24 in., depending on material. It is not intended for rock work.

For wire rope, new lubricants are available containing minute particles of soft anti-friction bearing metal. A photomicrograph of a section of rope thus lubricated shows the soft metal flakes filling the spaces between all wires and strands.

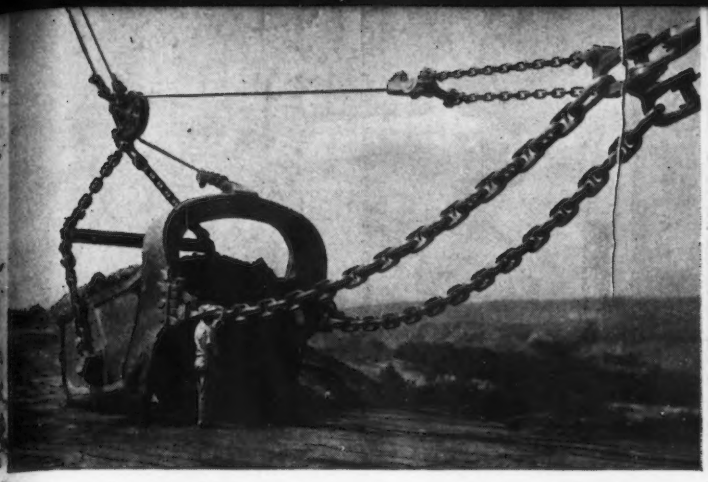
Transport. The so-called "drive-over" method of dumping trucks without backing them up, page 125, is at times assisted by using an electric eye to open and close the hopper doors as the truck cuts the light beam.

The tire-repair shop scene shows foreman Vic Lager hoisting a tire to place it in the vulcanizer. See bottom of p. 125.

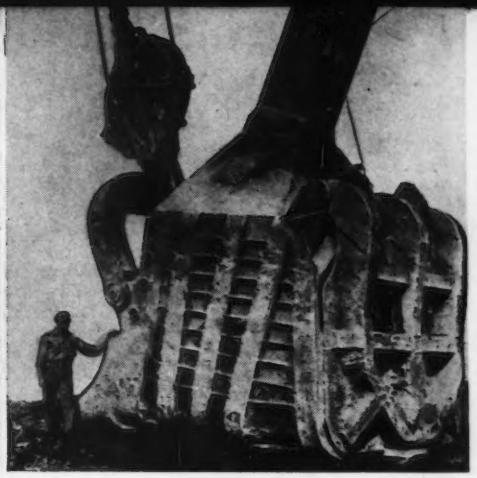
(*Continued on p.* 126)



TRACTOR-DRAWN conveyor-loader stripping Georgia kaolin.



A BIG BUCKET, 21.4 cu. yd. with 215 ft. boom, as in dragline at left; 25 cu. yd. with 180-ft. boom.



STILL BIGGER, this shovel dipper, used in coal stripping, takes 40 cu. yd.

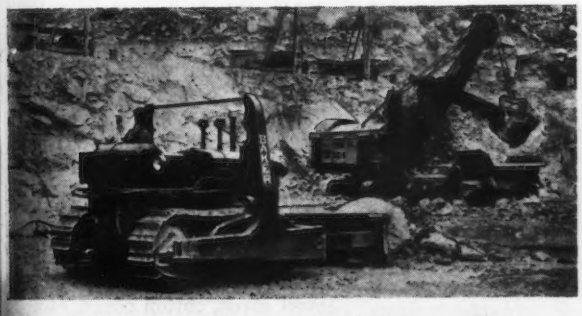
GIGANTIC EXCAVATORS TAKE GIGANTIC BUCKETS, DIPPERS

DIESEL-DRIVEN through clutch but has electric swing.

MOST DRAGLINES are of modest size. This has 45-ft. boom.

THE BULLDOZER HAS MANY USES IN SURFACE MINING OPERATIONS.

THIS TRACTOR clears haul roads, helps shovel behind it.

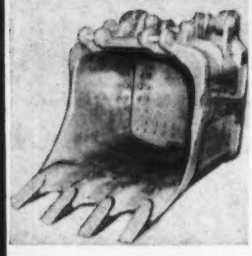


BULLDOZING gold placer tailings back for rewashing.

CLEARS 2 ACRES daily for dredging, digs ditches, loads.

RUBBER-TIRED DOZER is efficient, mobile, fast; can do 15 mph.

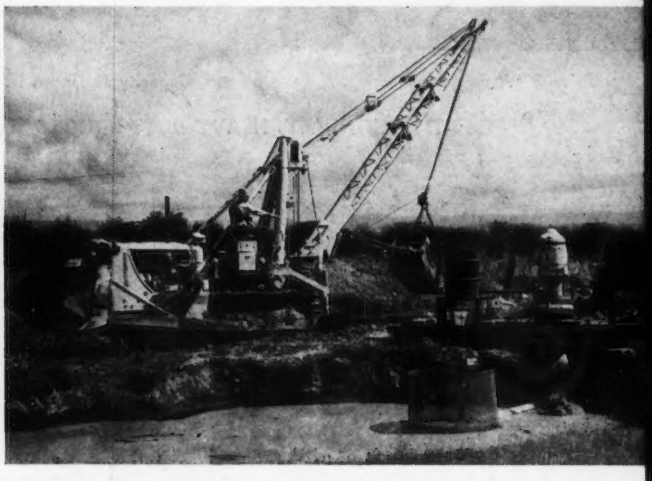
P. 123



ABOVE, a 4-piece dipper.
BELOW, a 2-piece dipper.

AFTER STRIPPING, this Florida dragline, following general practice in pebble phosphate field, also mines the phosphate, depositing it on bank, where monitors sluice it to plant.

MAGNETIC-TORQUE CONTROL is a feature of this new electrically-operated shovel.



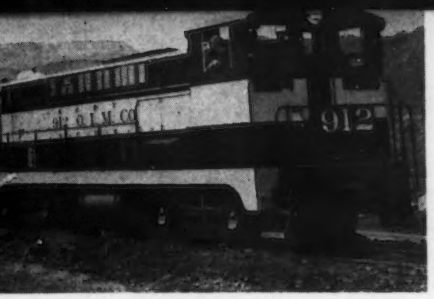
HYBRID COMBINATION of tractor, bucket and bulldozer has many uses on dredging property.

HIGH-SPEED SCRAPER can do 23 mph., carry 3.3 cu. yd.

ROAD EQUIPMENT maintains pit roads and approaches.

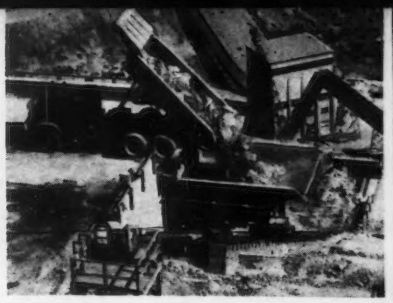
A 17.5-CU. YD. SCRAPER, 18 mph. at top speed.

SCRAPERS AND DOZERS have removed over 30 ft. of overburden.

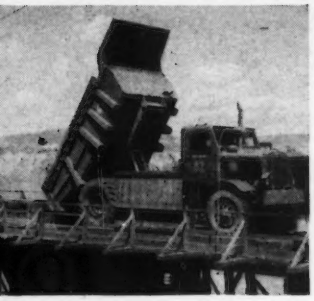


Diesel-Electrics for steeper grades.

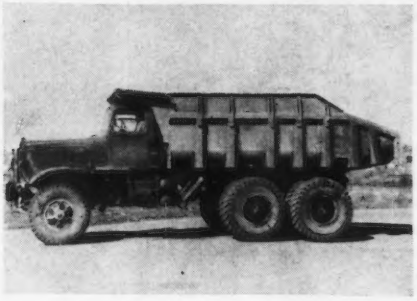
Car shakeout speeds unloading.



40-Ton skips lower ore to crusher, Cananea.



Drive-Over" dump, no backing.



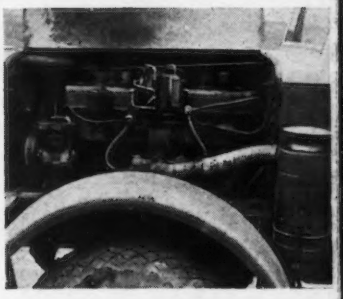
Capacity 30 tons as truck, 50 as trailer.

Replaceable cast-manganese bottom liners.

OFF-THE-HIGHWAY, HEAVY-DUTY TRUCKS AVAILABLE UP TO 80,000-LB. CAPACITY

Rear-axle suspension aids rough going.

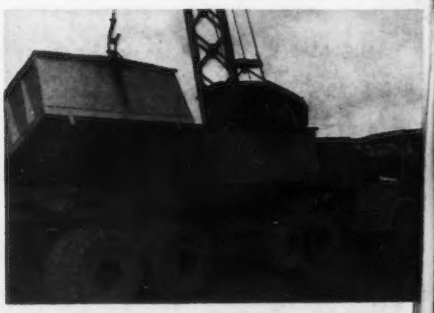
Trunnion-mounted front axle helps.



More power from butane carburetion.

Trailers, 30-ton, Snyder Mining.

Semi-Trailer, loading stone.



Trailer dumping Utah iron ore.

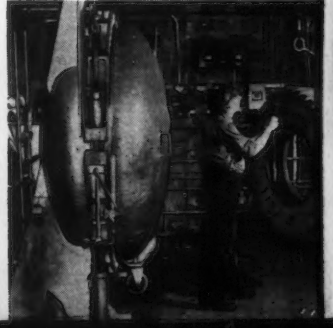
TRAILER LOAD IS MORE PULLED THAN CARRIED, OFFERING ADVANTAGES

Tractor with two 30-ton loads.

P. 125

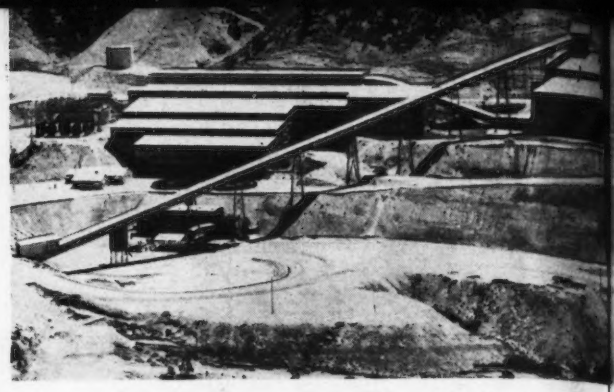
Tractor-Wagons, crawler-mounted.

Butler Brothers repair own tires.



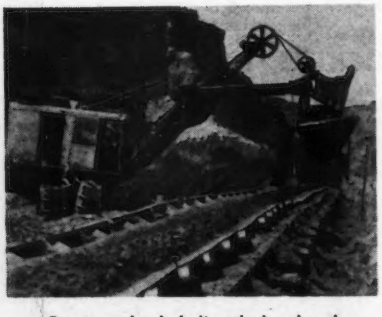
XUM

Morris conveyor, Oliver Iron, 1,080 ft. long, c. to c., lift 249 ft.

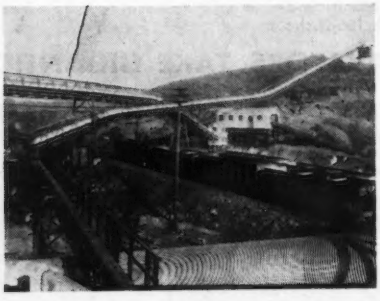


Castle Dome's 42-in. conveyor belt is 2,320 ft. long.

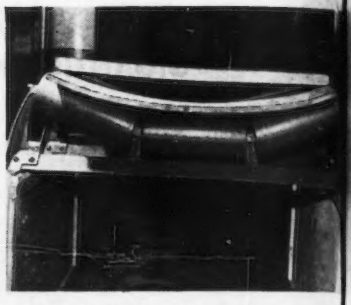
CONVEYORS GIVE CHEAP TRANSPORT OUT OF PIT, PERMIT TRUCKS TO OPERATE AT BEST



Conveyor loaded directly by shovel.

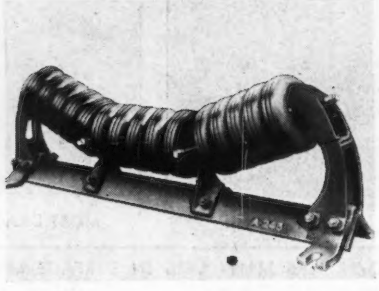


Aluminum for conveyer housing.



Strongest belt troughs perfectly.

Impact idlers support belt at transfers

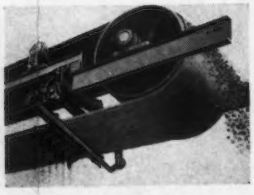


Impact idler, another type

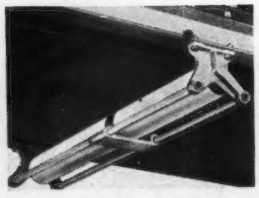
Use of butane carburetion and butane as fuel, plus engineering, converted the engine shown on opposite page from 225 to 300 hp.

Snyder Mining Co.'s side-dumping trailers carry a large load per driver, have large braking surface because of minus 8-% grade, and dump without backing. A 4-wheel drive unit, with all tires the same size, has a good traction in all weather.

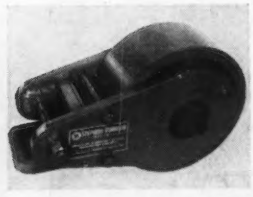
The conveyor belt said to be strongest, which is shown troughing perfectly, is as strong as the 17-ply belt of the usual construction above it, which is too stiff to trough. Its strength derives from combining nylon and patented yarn. The first installation will be 2,600 ft. between centers, incline 15 deg., lift 630 ft. Some other stronger-than-usual belts are made with steel cords, cotton cords, etc.



Scraper cleans belt.

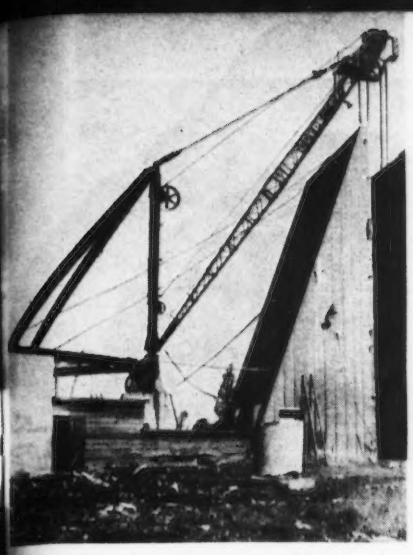


Self-aligning idler.

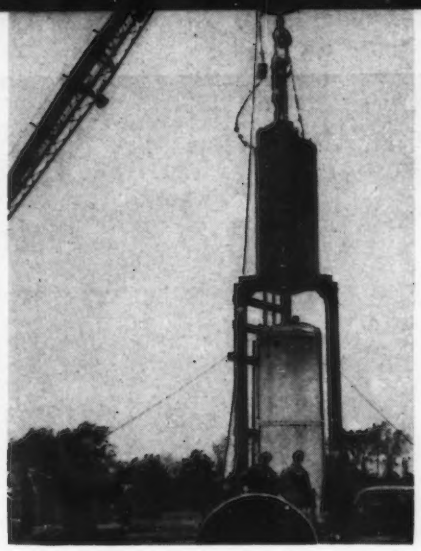


Automatic belt holdback

P. 126 National Lead Baroid Sales Div.'s conveyor will send ore to mill, overburden to dump.



A DERRICK handled the boring machine and other equipment.



BORING MACHINE out of hole. Drive cabin followed cutting tool down hole.

CORE PULLER with core and bomb-holder for breaking core.

NEW SHAFT, CARY MINE, GOGEBIC RANGE, WAS ENLARGED FROM 5½-FT. SHOT-DRILLED BOREHOLE, 2,400 FT. DEEP

Big-Hole Drilling for Sinking Shafts

DRILLING RIG with tools outside, over 6-ft. hole, in Peru.

TO HELP CONTROL SHOT, thickened cutting edge of bit is slotted.

DRILL CORE on surface, fragments moved by bulldozer.

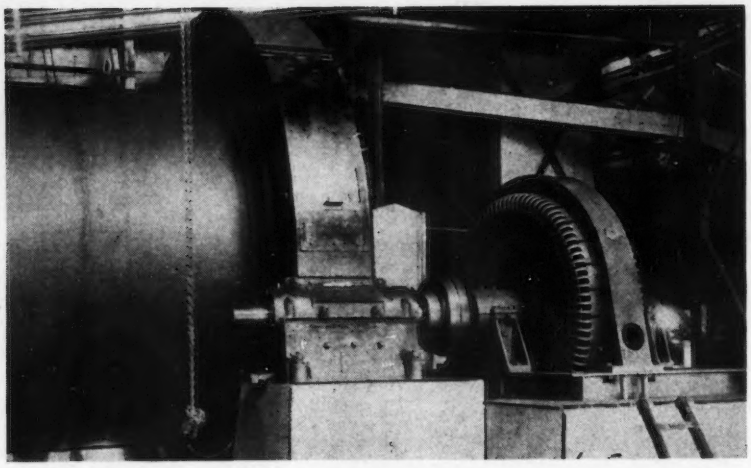
DRIVE CABIN FOLLOWED CUTTING TOOL DOWN HOLE DRILLING DEEP 6-FT. HOLE ON HYDRO JOB IN PERU.

BULLDOZING core fragment away from hole.

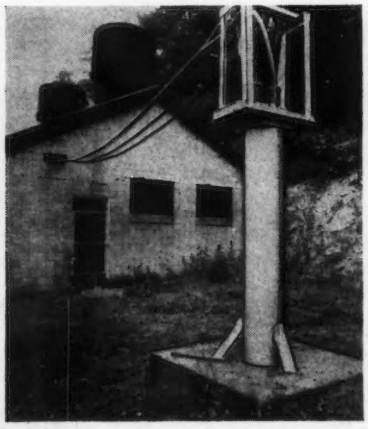
HARD-SURFACED REAMER enlarged churn-drill hole to 48-in.

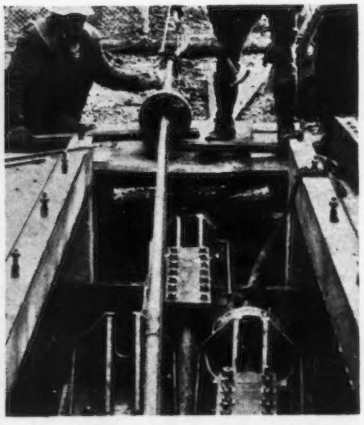
LOOKING DOWN a 48-in. shot-drilled bore-hole in Australia.

P. 127



CUTTING MINE POWER COSTS. Penalties are specified in most mine power contracts for (1) low power factor, and (2) high peak loads. Power factor can be corrected by installing more synchronous motors like the one shown above, and by using capacitors (at right). Peak loads can be controlled by installing meters for study, and employing automatic devices for off-peak pumping, crushing, etc.

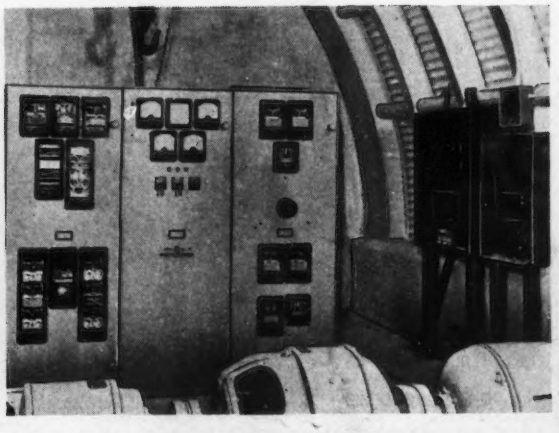




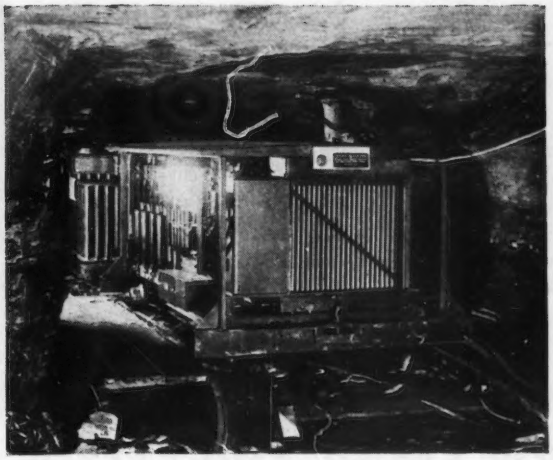
BORE-HOLE CABLES are used to bring power supply closer to load point and cut line losses. Aluminum conductor is shown at left, and armored cable at right.

MINE PLANT

IMPORTANT TRENDS noted in regard to general mine plant are: (1) more attention is being given the efficient use of electrical power, (2) initial power distribution systems are being designed to handle added loads required as mines grow in size, (3) electric power is being transported to load centers at higher voltages than previously, (4) diesel-electric units are being used more extensively, (5) surface plants are being equipped with more and larger cranes and materials handling units. However, frequency of mine fires indicates some laxity in fire-prevention.

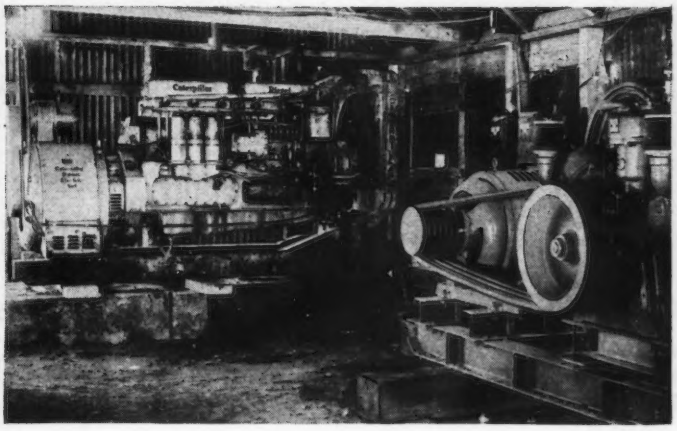


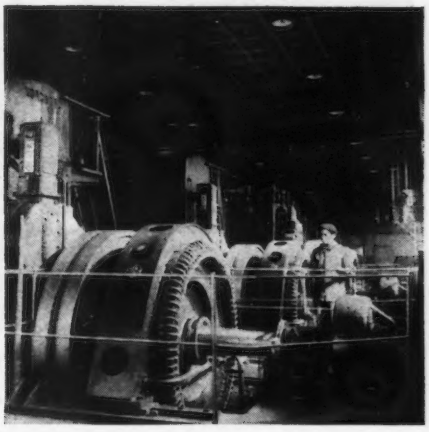
MOVING ELECTRIC POWER CLOSER TO THE FACE. Instead of transporting compressed air through long pipe lines, it is more economical to move compressor nearer to face. Modern enclosed switchgear (at right) is one part of Bunker-Hill's new underground high-voltage electrical distribution system, designed to use power more efficiently and constructed large enough to handle future needs of a growing mine. Because of moisture and general rugged conditions, many mining companies formerly hesitated to distribute a.c. power at high voltage. Today, however, operations like Climax distribute power to underground substations at 13,800 volts successfully.



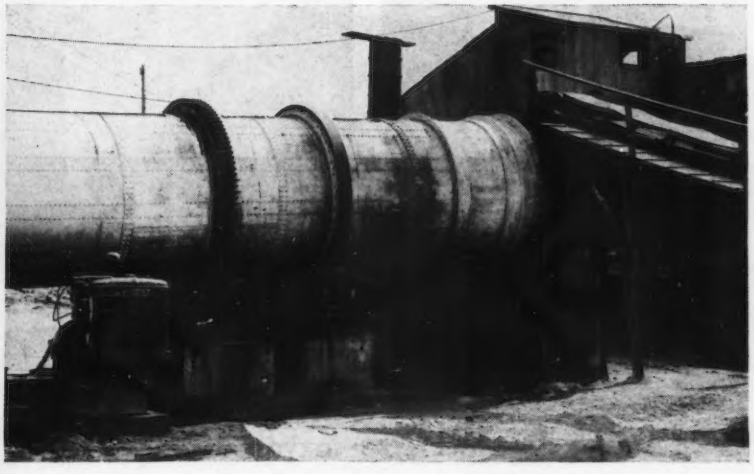
PORTABLE D.C. SUBSTATION is ideal for expanding mining operations. Unit above includes ignitron-type rectifier, heat exchanger, liquid-filled transformer, and automatic switchgear.

DRY-TYPE TRANSFORMER is designed for mine service. Use of silicones gives added heat resistance needed to reduce height to 25½ in., and reduce weight to half that of liquid-filled types.





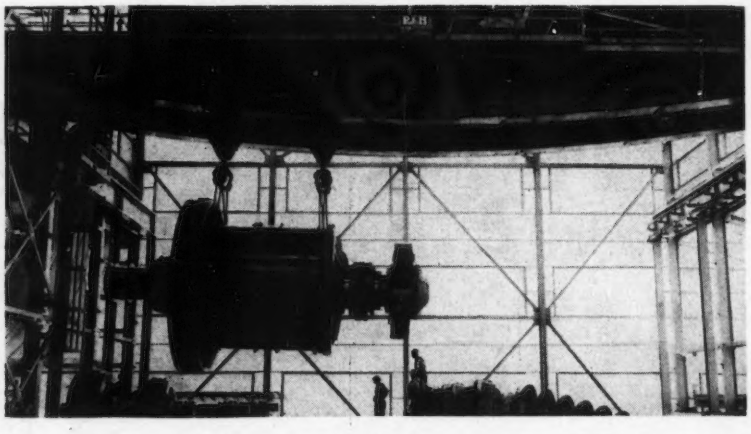
DIESEL-ELECTRIC PLANTS, like the one above, are suitable for small mine operations which are relatively inaccessible. Larger units, shown at right, are installed in main power plant of South American lead mine situated in remote mountain region.



DIRECT-CONNECTED DIESEL POWER. Mines employing diesel-electric power frequently use direct drive units to run equipment. Engine above is connected to rotary dryer handling potash at a Western property. Other units drove ball mills and pumps.

VELOCITY POWER created by small blank cartridge of smokeless powder splices mine and industrial cables speedily and effectively.

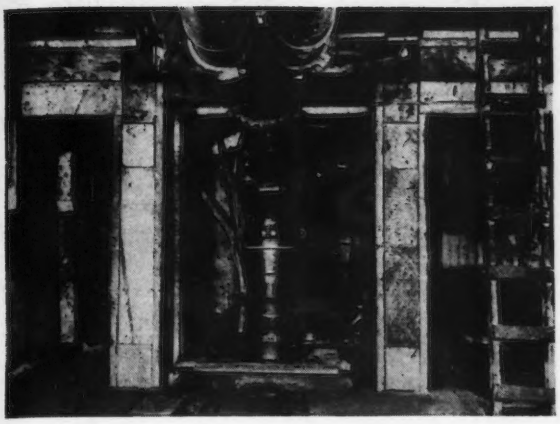
POWER TOOLS DO THE JOB EASIER AND FASTER



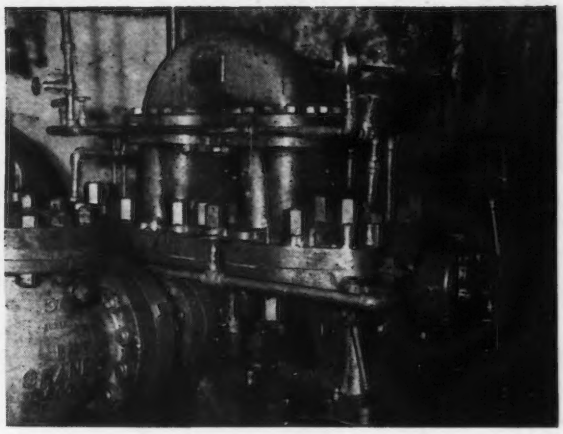
HANDLING MACHINERY causes serious operating delays, especially if hoists and cranes are lacking. For example, it took ten hours to dismantle rod mill (left), move it to repair bay, and install a new mill. Same job took 1 hr. and 55 min. with same number of men, and a crane capable of carrying mill plus load. Crane at another property (right) shows how job should be done.

FLOODLIGHTS | **COOL DRINKING WATER** | **OXYGEN-BREATHING UNITS**

Details like these are important for safety and health of men, and for protection of mine plant. Floodlights are now being used in stopes and development headings. Oxygen in breathing apparatus (at right) is generated in a replaceable chemical canister.



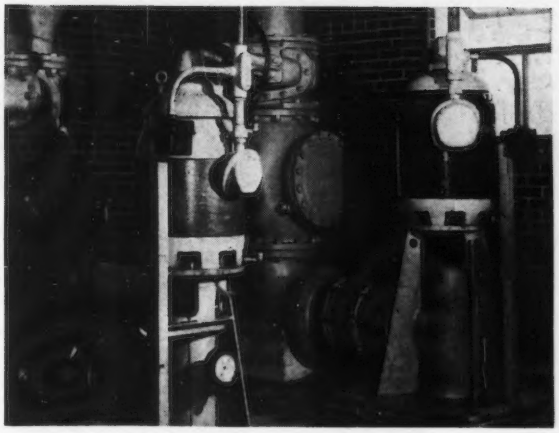
SUBMERSIBLE TURBINE PUMP



MULTI-STAGE CENTRIFUGAL PUMP

PUMPING

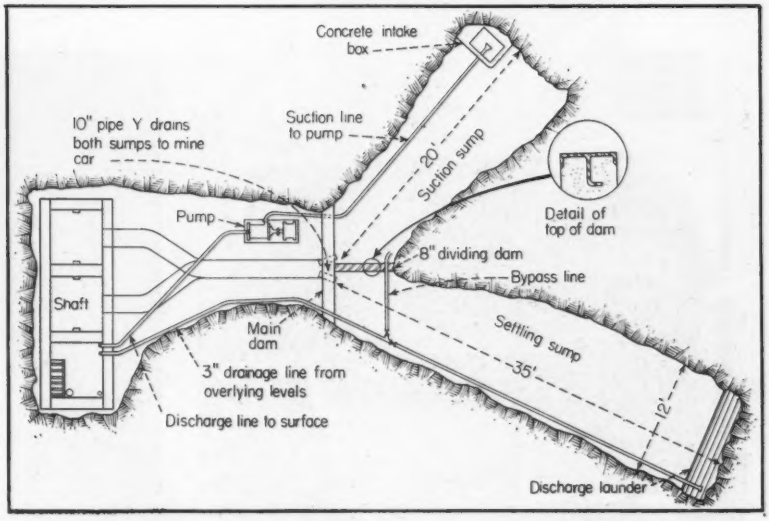
SOME TRENDS in modern pumping practice are: (1) Use of automatic devices to operate pumps on off-peak power, (2) substitution of fewer, larger, and more efficient units for many small units, (3) installation of several units of same design, so that one pump may be used to replace another, and repair parts will be interchangeable, (4) use of submersible deepwell types (see above) for large unwatering jobs, (5) installation of both turbine and centrifugal types at a single shaft to prevent flooding and permit shutdowns for repairs, (6) treatment of acid waters with lime to prevent corrosion, (7) use of self-priming units to cut down supervision, (8) design of pump stations with positive heads on "suction" line to avoid loss of priming, (9) manufacturers are offering more specialized designs to handle the wide range of pumping requirements of the mining industry, and at higher efficiencies.



SILICONE INSULATION was used in rewinding these sump-pump motors, enabling them to handle 50% more capacity because of heat-resistant qualities of silicones. Silicone-insulated pump motors handling chemicals can be hosed off.

REGULAR INSPECTION

Regular inspection and preventive maintenance on pumps have greatly increased impeller life and cut pumping costs. On rubber-impellered tailings pump like this one, tons pumped by each impeller has increased from 64,230 tons when first installed, to 225,500 tons. Better rubber was partly responsible, but inspection gets chief credit.

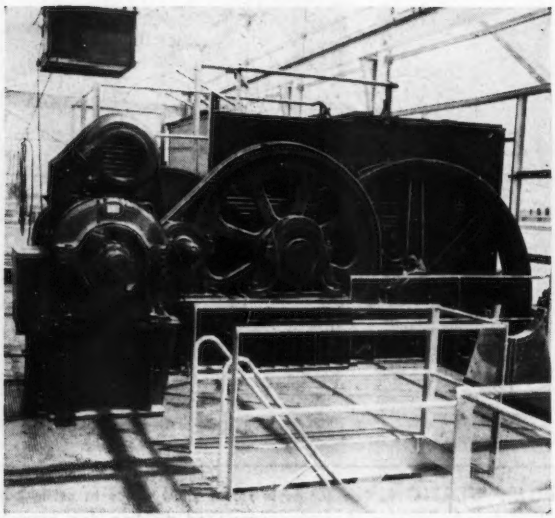


WELL PLANNED PUMP STATION. Two sumps in series allow solids to settle out. Turbulence is prevented by launder at rear of settling sump, and dividing dam between settling sump and suction sump. Sump muck is removed through drain pipes in dam. Intake of pump is lower than discharge of sump so that suction head will be positive.

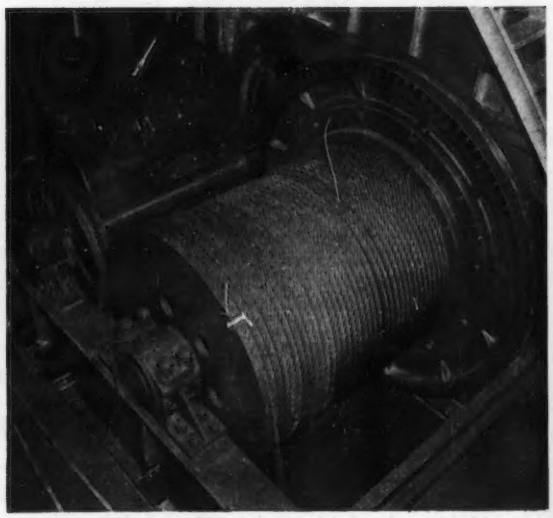
1 KEYMAN on any placer dredge is the winchman who controls it and on whom successful operation depends. Note how modernized electrical controls have replaced old-time back-breaking levers, and made it easier for winchman to handle dredge and do a better job.

MODERN PLACER DREDGING

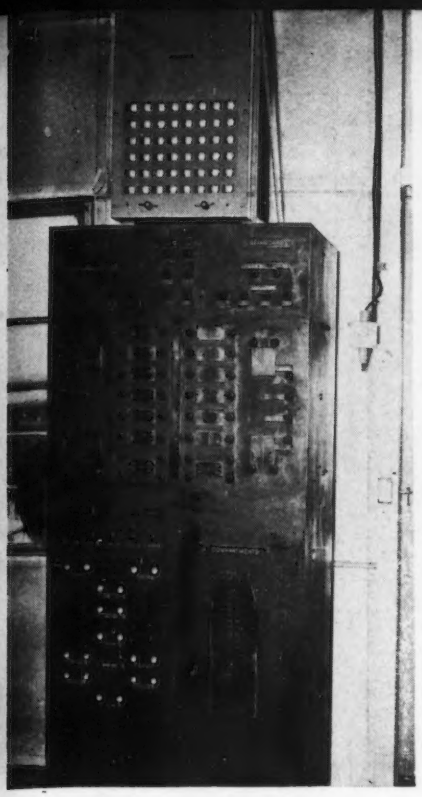
The simplicity of digging and washing gravel may make job look easier than it really is. Here are some new ideas aimed at making placer dredging as easy and low-cost as it looks.



6 WARD-LEONARD CONTROL on this main drive gives wide choice of bucket line speeds for varying digging conditions.

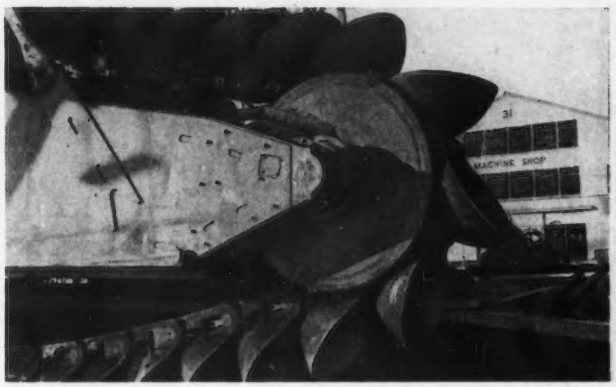


7 CAN'T SNAP BOW LINES because this d-c.-driven swing winch is easily set for maximum pull less than rope's breaking strength.



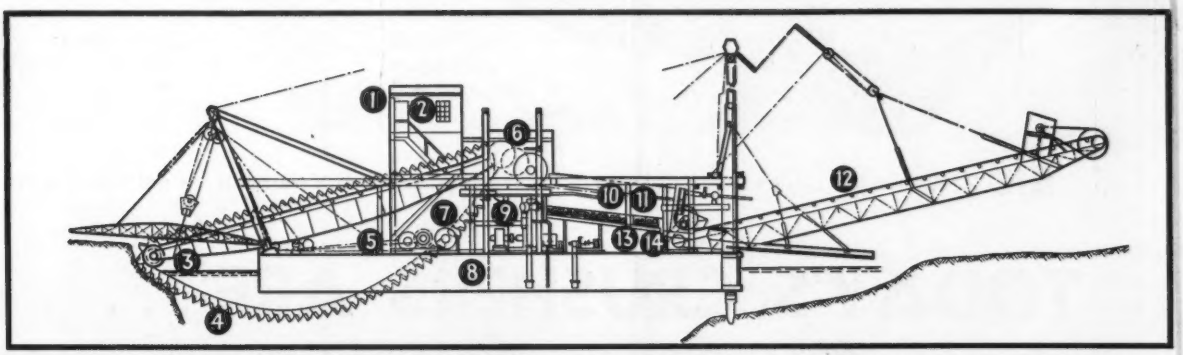
2 PANEL LIGHTS show winchman which electric motors are running. Top panel signals if water in any hull compartment.

4 LIPLESS BUCKET can't throw lips to break spray pipe. Worn buckets are "re-lipped" with manganese-nickel weld metal or welded-on steel bars.



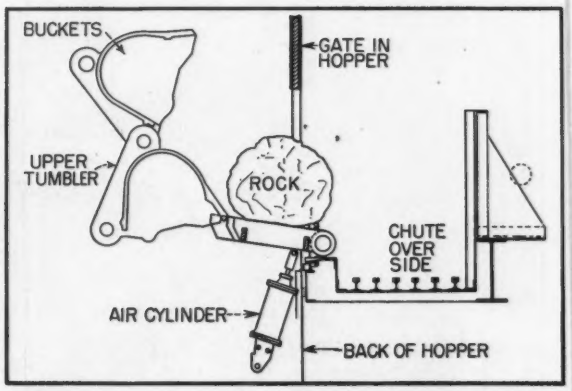
3 NO LOST TIME for "oiling up" on new dredges. Lower tumbler, ladder rollers, bucket idlers, upper tumbler drive are all sealed, get automatic greasing by centralized system run inside ladder.

5 SPEED A
ropes sup
drum. Ward-

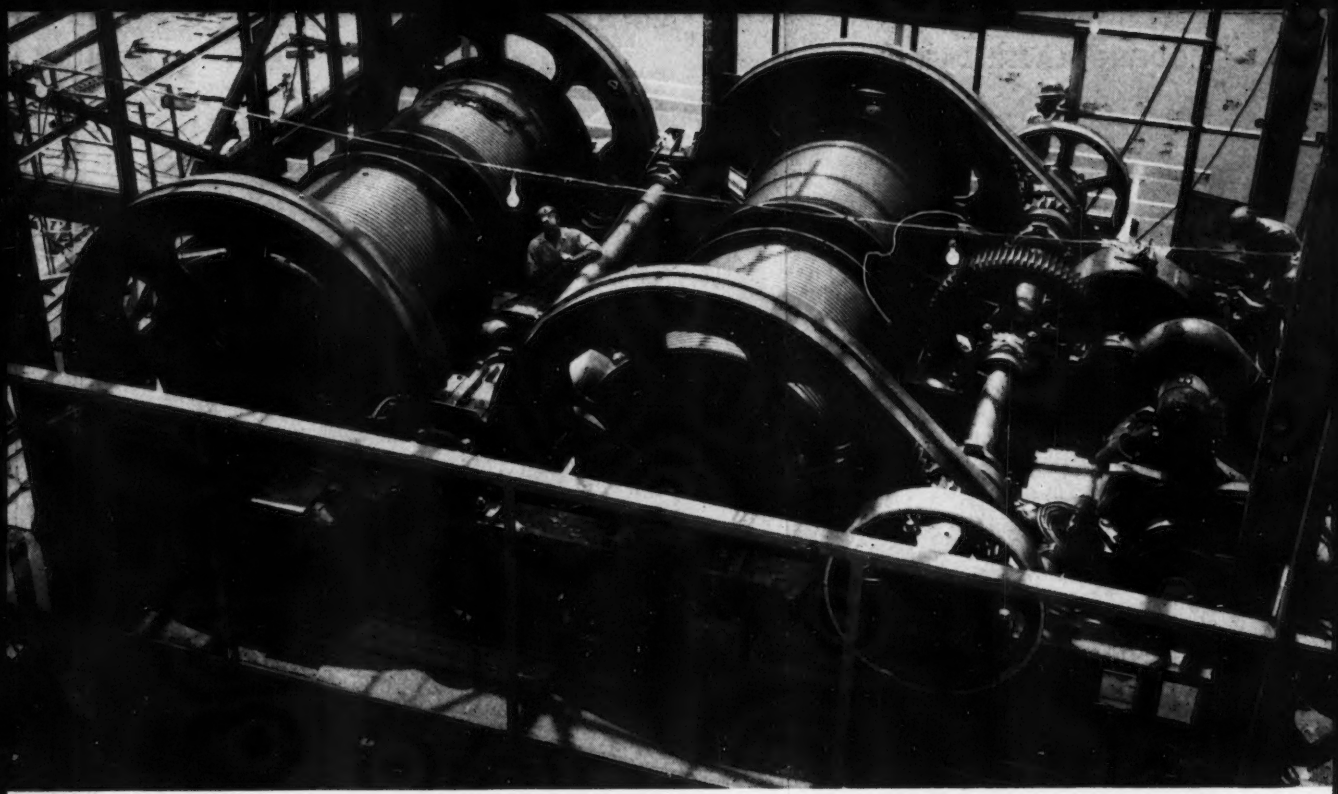


FIGURES ON THIS SKETCH SHOW ORDINARY LOCATION OF UNITS LIKE THOSE PICTURED ON THESE PAGES

8 USING DIRECT CURRENT on dredges adds m-g. sets, like this 60-hp. unit. Operating advantages offset higher initial cost.

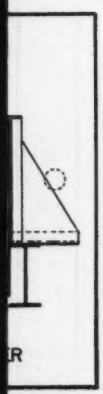


9 ROCK DUMP avoids struggles with boulders on bucket line. Air cylinders operate gate and grid; rock is by-passed to pond.



SPEED AND CONTROL are essential in good ladder hoist. Here two ropes support ladder, each end of each rope being wound on a separate um. Ward-Leonard variable-speed d.c. motor system, driving hoist, gives both speed and control. Ladder is hoisted rapidly, and is lowered under power swiftly but with precision. This ease of control helps winchman get better yardage and acts as safeguard against accidental damage.

GES



R

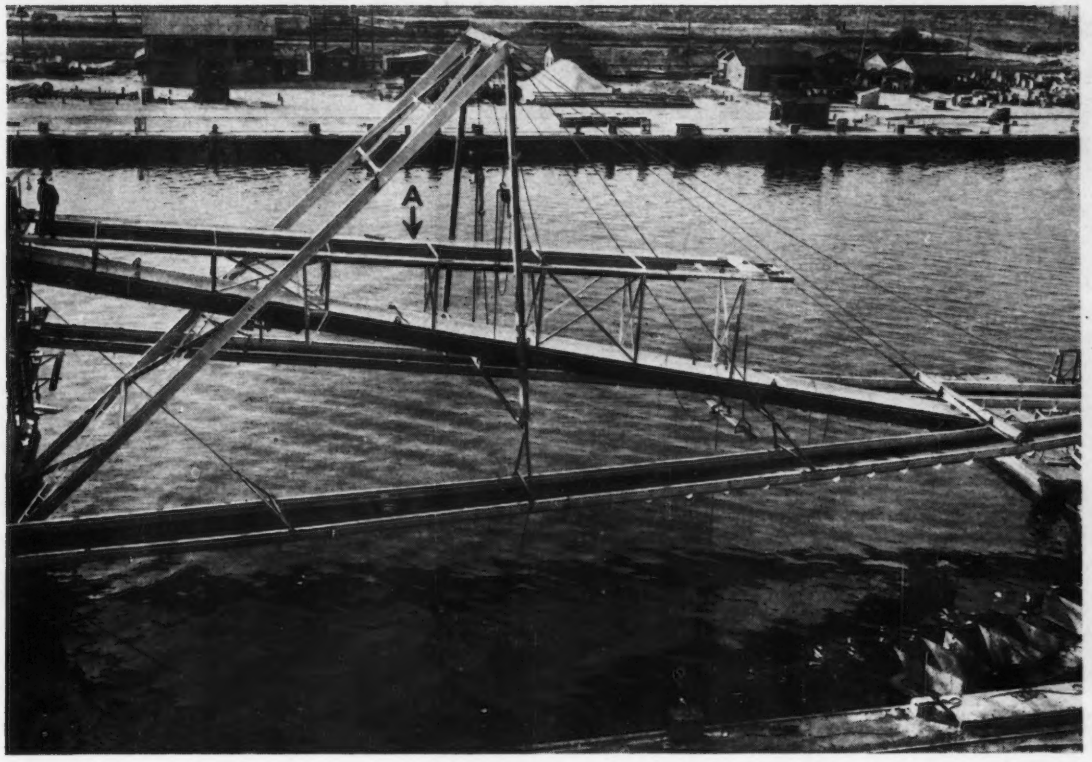
t line. Air pond.

10 NOTE the unusual tubular-plus-cross-member bracing on this 10x70-ft. screen. Design is strong yet light.

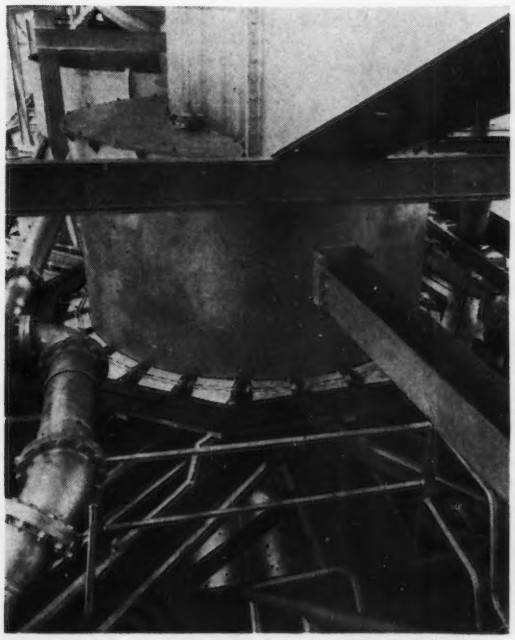
11 COMPACT screen drive has reducer with gear (A) and pinion (B) only 21,837 in. center-to-center.

(Continued on next page)

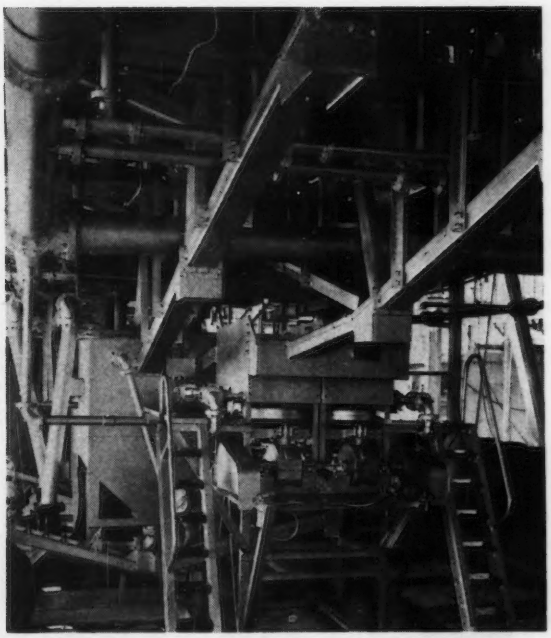
XUM



12 WHEN THIS TIN DREDGE digs gravel, a sliding clay chute will rest, unused, on platform marked "A" extending in rear of dredge. When dredge digs clay or barren overburden, chute will be run up inside screen, will catch material dropping out of buckets, slide it on out at stern. By moving stacker off-center, which has been done, gold dredges could use this idea, too.



13 PROPER DISTRIBUTION is important on gold dredges no less than on tin dredges. This distributor on a tin dredge takes all of screen undersize, splits it over flat cone, spreads it evenly among 24 flow lines of rougher jigs. Trend on gold dredges is toward similar schemes.



14 PLENTY OF HEADROOM has been provided for this washing plant on a tin dredge. Flowsheet includes 96 rougher jig cells (42-in.), 24 cleaner jigs, and shaking tables for fine tin ore. This particular dredge has automatic samplers to check efficiency of the washing plant.

XUM

. . . BIG. More mills are saving man-hours with crushers big enough to crush a day's tonnage in one shift instead of two.

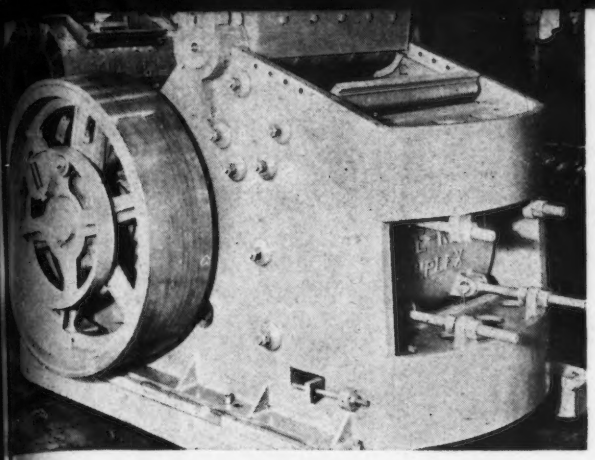
TODAY'S CRUSHERS ARE . . .

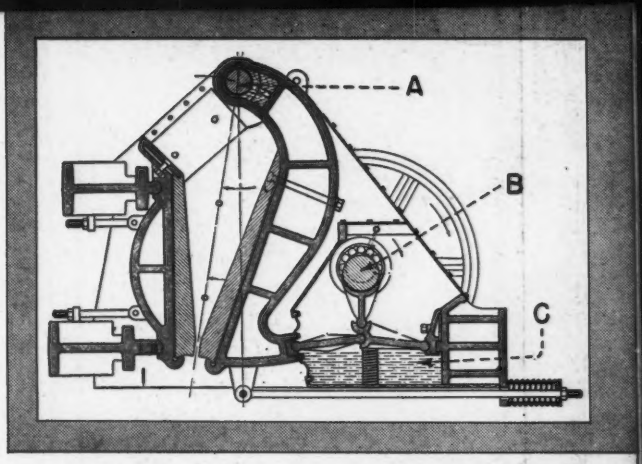
. . . PROTECTED.

A manganese steel scraper tooth can slide over a magnetic pulley, under a suspended magnet, and go on perhaps to wreck an expensive crusher, despite built-in safeguards.

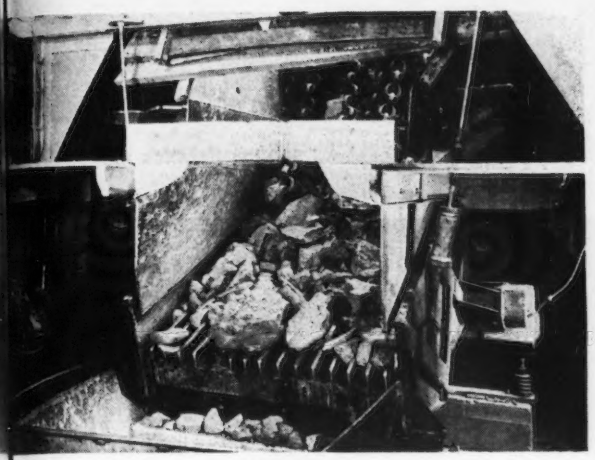
One way to prevent such damage is to use a magnetic detector as shown at left, which stops the conveyor and signals audibly and visibly when steel fragments pass through it. With this device, non-magnetic manganese steel used in the mine must be pre-conditioned with small steel or Alnico inserts welded, for example, to scraper teeth. This insert will trip the detector if a broken tooth comes in on the belt.

An electronic tramp iron detector that trips on all steel, magnetic or not, was described in EM&J for August, 1945.

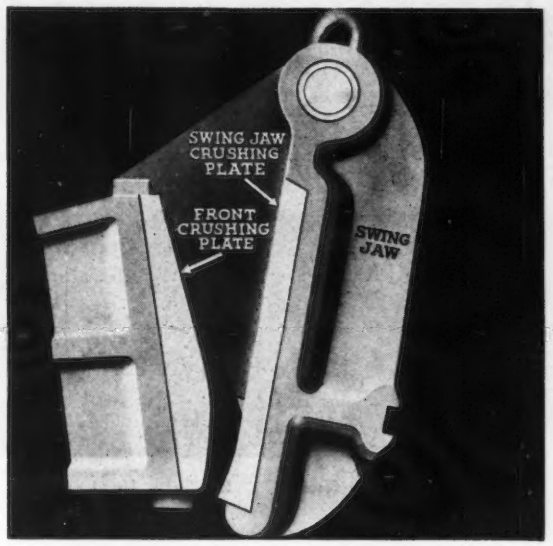




. . . ECONOMICAL. Three low-cost points are made for this primary crusher. One, hinge pin (A) located on center line of crushing zone saves wear on jaw plates. Two, ingenious design of eccentric (B), pitman, and toggles cuts power requirement. Three, unusual smoothness, plus oil bath, (C), permit running crusher at high speeds, yet act to protect mechanism.



. . . FED PROPERLY. The only way to get best performance out of a crusher is to give it a steady feed at its optimum rate. The biggest plants can not always do that, but smaller mills can use good techniques like chain feeder-vibrating grizzly combination shown above. This rig not only helps crusher, it permits installation of automatic or remote control.



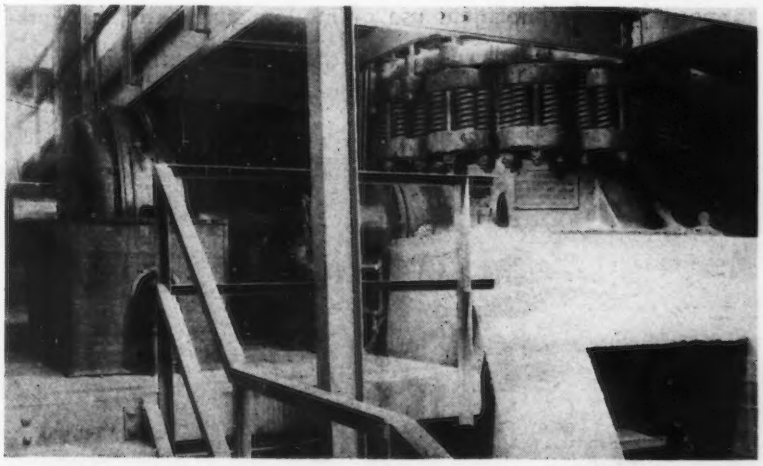
. . . DESIGNED BETTER. Curved jaw plates, non-choking and long-lived, will fit most crushers; they typify improved engineering available in modern crushing units.

. . . DRIVEN WELL.

Crushers can be driven by synchronous motors (the 200-hp. motor at right, for example), and the plant power factor thereby profitably improved.

But such circuits must be so arranged that at start, and under extreme load, the motor will run as an induction motor, reverting to synchronous operation only when full speed is again reached.

This is now done in a few plants with a complex set-up involving a motor, a drum, and contactors. However, a new system has only just been worked out that uses a simple electronic device to establish synchronization. Mills operating in districts with high penalties for lagging power factor might consider this drive for new units.



XUM

AIDED BY INSTRUMENTS, four men (see typical shift below) can run this complex 1,900-ton flotation mill.

Ed Montgomery, shift foreman

Ray Swain, No. 1 operator

Harold Hamby, No. 2 operator

L. Patterson, No. 3 operator

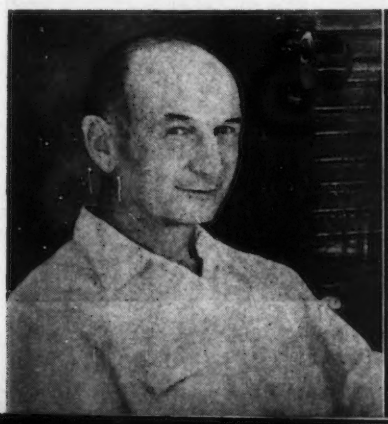
AUTOMATIC CONTROLS

Tennessee Copper Co.'s London mill (above) and Isabella mill (opposite) typify intelligent use of modern automatic, or work-saving, devices. The following pages show these controls in action.

J. F. Myers, mill superintendent

F. M. Lewis, assistant superintendent

P. 138



NO PROBLEM faced by millmen today is tougher than this one: How can one keep operating quality up and costs down in the face of a shortage of experienced mill operators and a rising labor cost?

If a mill could be run automatically, the problem would be solved; therefore, the closer one can come to automatic operation, the closer one approaches a solution. Many mills have tested or installed automatic devices in recent years, and much progress has been made. As outstanding examples one might mention Normetal Mines, Combined Metals Reduction Co., Utah Copper Co., and several others. We lack the space to discuss all their work.

However, what *E.&M.J.* can do is to select one mill that is typical of

Photographs by Kile, Stanfield Studio, Cleveland, Tenn.

ONLY THREE MEN PER SHIFT run this 1,200-ton mill, make successful three-product separation.

R. W. Brown, shift foreman

A. F. Powell, No. 1 operator

Eugene Goode, No. 2 operator

CUT MILLING COSTS

the best modern practice in control technique and to show that mill in operation. The mill so chosen is really two mills with almost identical flowsheets: the London and the Isabella mills of Tennessee Copper Co., at Copperhill, Tennessee.

Operated by small, good crews, like the two shown above, and directed by the alert management shown below, the two mills of Tennessee Copper point the way to a better job of milling. We do not insist that the methods pictured here could solve everybody's milling problems, but we *do* think the spirit shown here could help a lot.

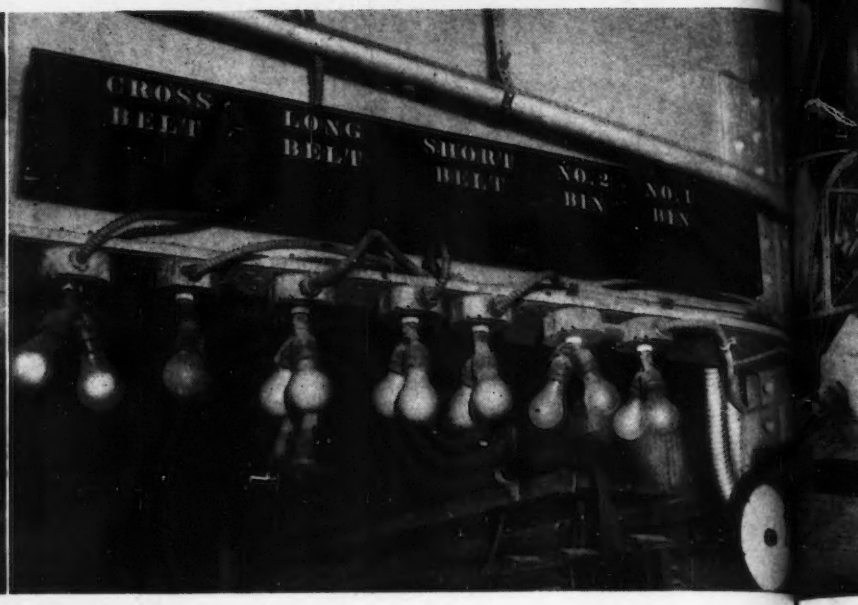
(*Continued on next page*)

G. B. Hamby,
mechanical engineer

T. M. Postelle,
London general foreman

T. H. Walker,
Isabella general foreman

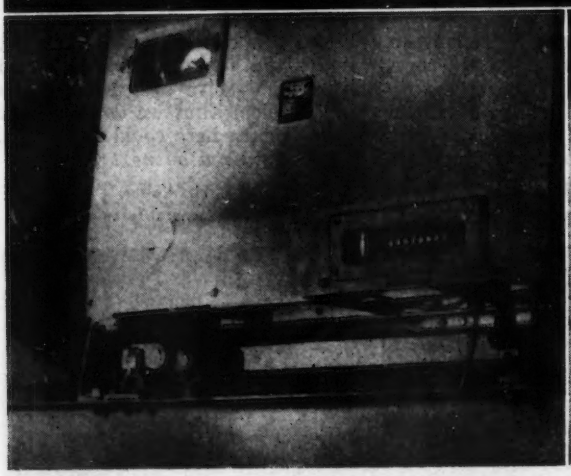
XUM



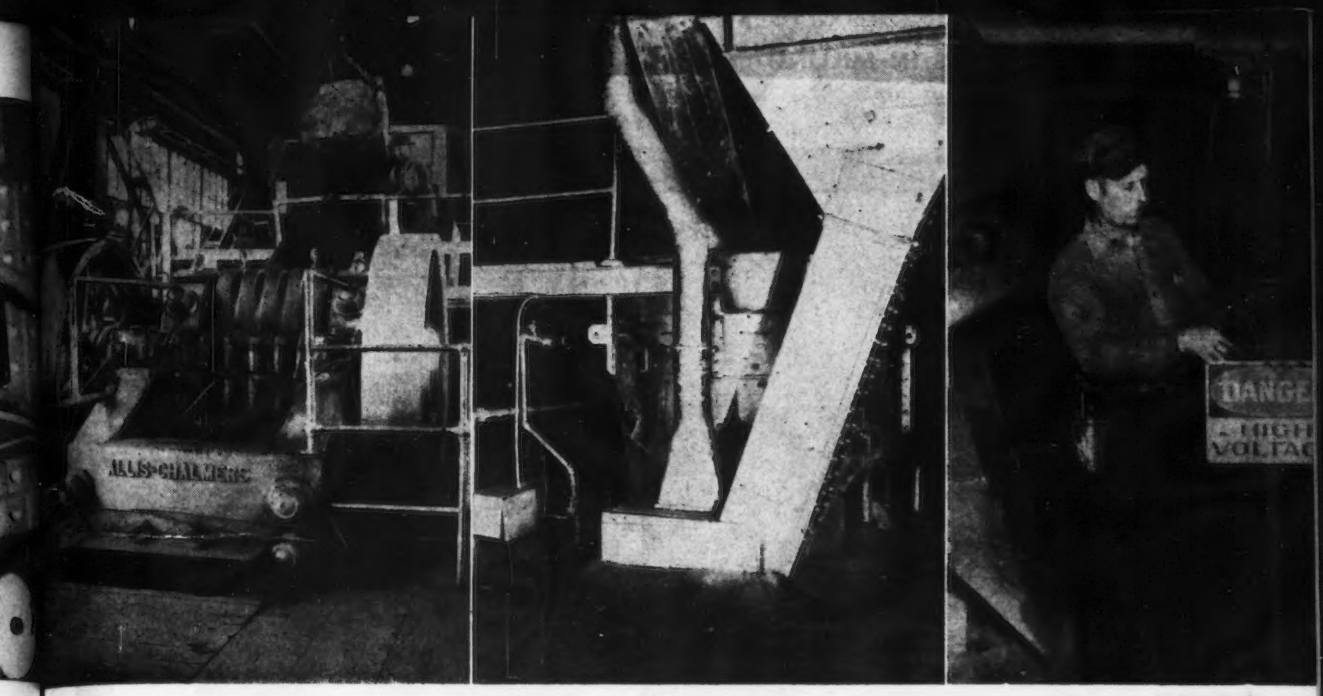
CRUSHING PLANT takes one man (Clarence Adams here), who uses signal lights, cable,

TONS ORE	MILLS NO.1	NO.2	NO.3	NO.5	CLASSIFIERS BOX	NO.1	NO.2	NO.3	NO.5
1600	$\frac{3}{4}\cdot\frac{3}{4}\cdot\frac{1}{4}$	$\frac{1}{2}\cdot\frac{1}{4}$	$\frac{3}{4}\cdot\frac{1}{4}$		$\frac{1}{4}\cdot\frac{1}{4}\cdot\frac{1}{2}$ HP		$\frac{1}{4}\cdot\frac{1}{4}$	$\frac{3}{8}\cdot\frac{3}{8}$	
1650	$\frac{3}{4}\cdot\frac{3}{4}\cdot\frac{3}{8}$	〃	〃		$\frac{1}{4}\cdot\frac{1}{4}\cdot\frac{1}{4}\cdot 2$ HP		〃	〃	
1700	$\frac{3}{4}\cdot\frac{3}{4}\cdot\frac{1}{2}$	〃			$\frac{1}{4}\cdot\frac{1}{4}\cdot\frac{1}{2}\cdot\frac{1}{2}$ HP		$\frac{1}{4}\cdot\frac{3}{8}$	$\frac{3}{8}\cdot\frac{1}{2}$	
1750	$\frac{3}{4}\cdot\frac{3}{4}\cdot\frac{1}{2}\cdot\frac{1}{4}$	〃		$\frac{1}{2}\cdot\frac{1}{4}$	$\frac{1}{4}\cdot\frac{1}{4}\cdot\frac{1}{4}\cdot\frac{1}{2}$ HP		$\frac{3}{8}\cdot\frac{1}{4}$	$\frac{1}{2}\cdot\frac{3}{8}$	$\frac{3}{8}\cdot\frac{3}{8}$
1800	$\frac{3}{4}\cdot\frac{3}{4}\cdot\frac{1}{2}\cdot\frac{3}{8}$	〃		〃	$\frac{1}{4}\cdot\frac{1}{4}\cdot\frac{1}{4}\cdot\frac{1}{2}\cdot 2$ HP		〃	〃	〃
1850	$\frac{3}{4}\cdot\frac{3}{4}\cdot\frac{1}{2}\cdot\frac{1}{2}$	〃		〃	$\frac{1}{4}\cdot\frac{1}{4}\cdot\frac{1}{4}\cdot\frac{1}{2}\cdot\frac{1}{2}$ HP		〃	〃	〃

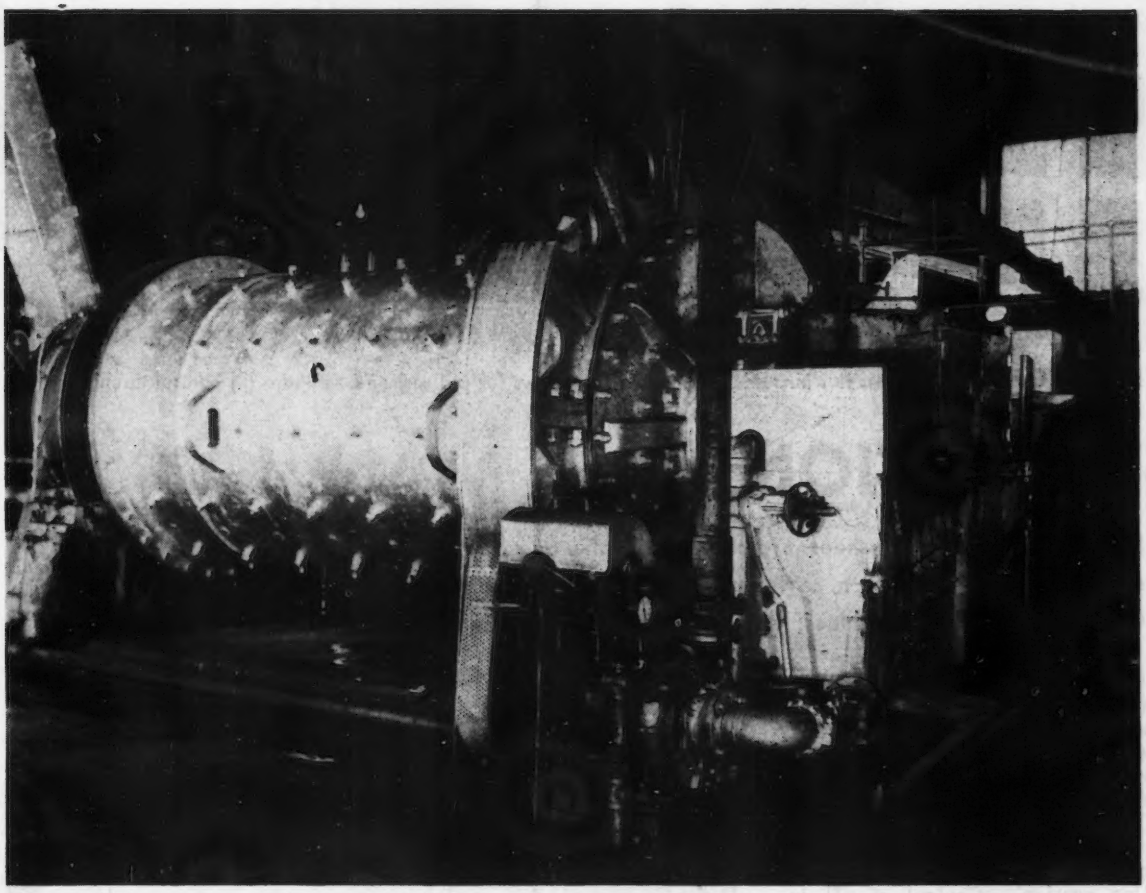
REMARKS.



GRINDING PLANT uses weighing feeders (left), wide-open water valves (right). Flows set by varying valve nipples as board directs (above) to suit fixed ore lead rate.



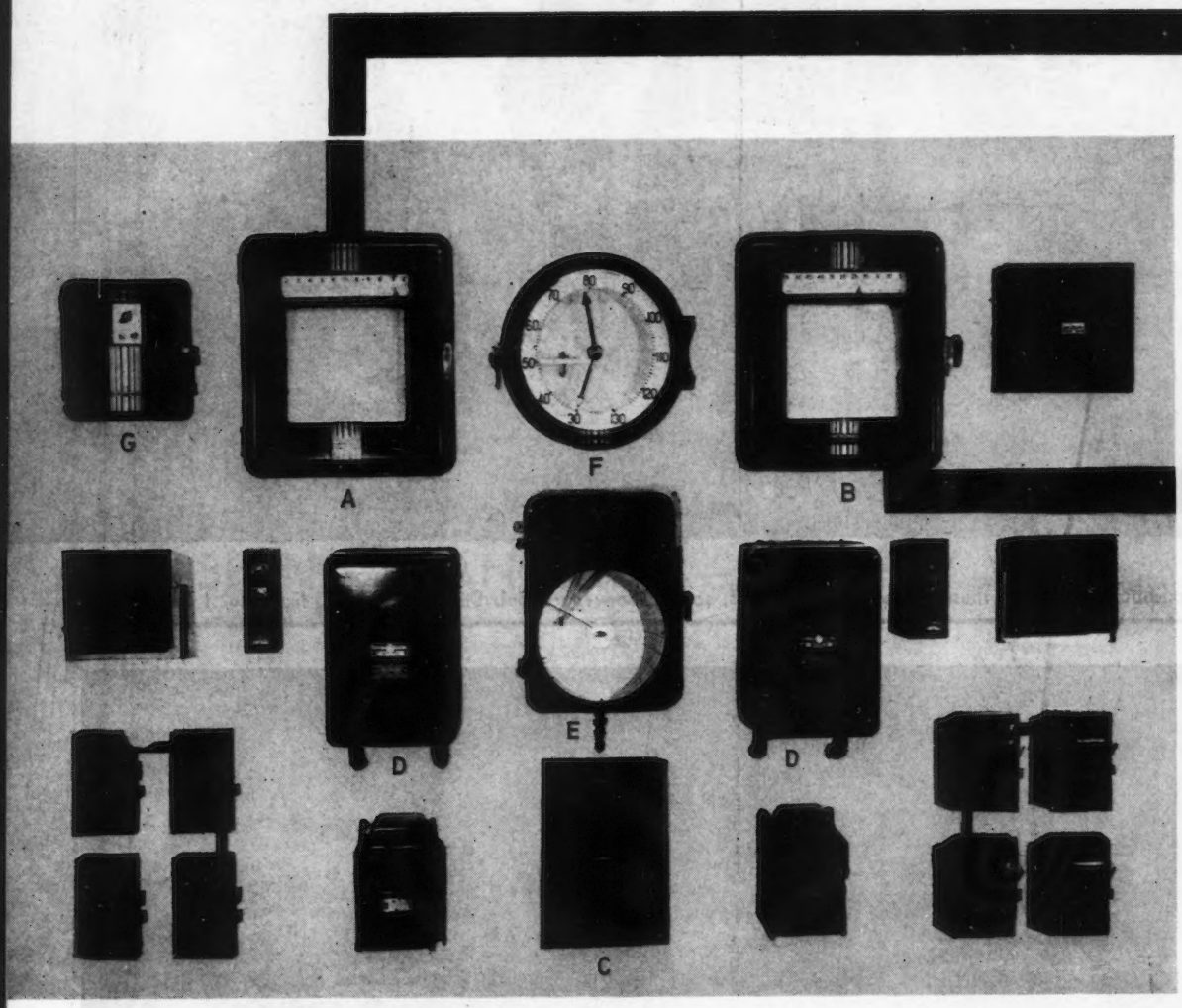
pushbuttons, to run these crushers, also feeders, screen, conveyors. Bob Stiles, electrician, fixes No. 1 bin tell-tale.



ALL GRINDING CIRCUIT CONTROL is fixed by valve pattern shown opposite. Operators alter it only if foreman shifts tonnage feed. Rod mill in open circuit (above) does fine crushing. Ball mills (1-in. balls) then produce minus 48-mesh grind in closed circuit.

(Continued on next page)

XUM



HEART OF THE MILL is this instrument panel. Follow arrows for pH (A) and xanthate (B) control circuits.

FLOTATION: ONE MAN JOB

Isabella and London flowsheets are complex, involve bulk float then separation of magnetic iron, pyrite, copper, and zinc concentrates. One man watches machines; helper tends reagents, samples.

SET UP in the center of the mill floor, the instrument panel pictured above shows just about everything that is happening in the London mill. The Isabella mill has the same instruments, arranged differently. These instruments are:

A records the pH in the regrind circuit that feeds the copper flotation section. Control of pH is automatic. G is a time-delay control that is adjustable and keeps the lime feeder from over-running the pH meter.

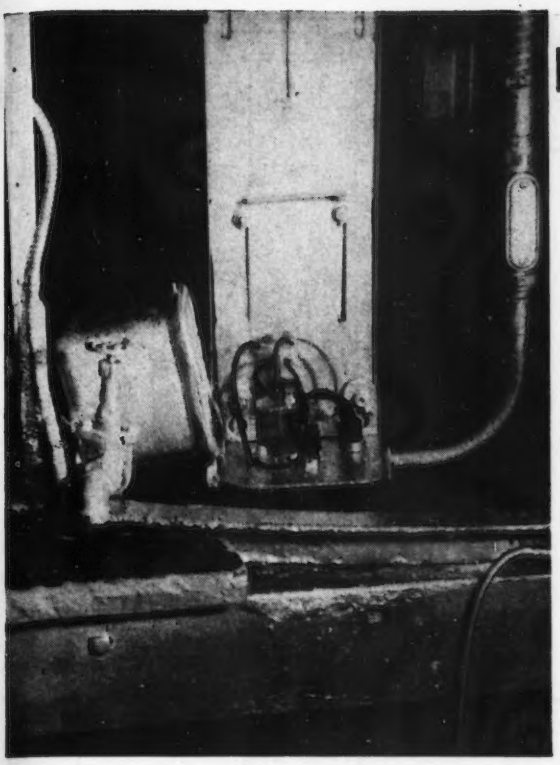
B records the quantity of xanthate being added to the bulk rougher flotation cells. Control is automatic.

C houses a conductivity cell (next page) that tests a continuous sample of mill pulp water.

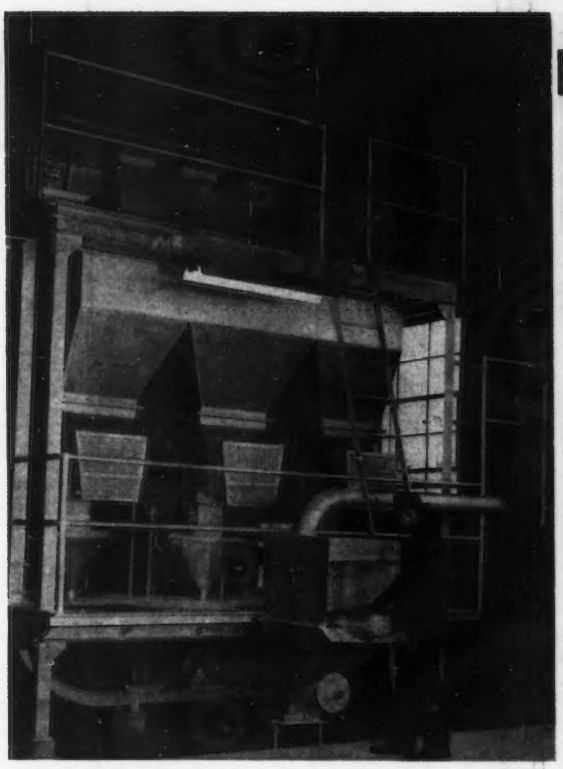
D are Thymotrols for supplying d.c. to the small motors that run the lime and the xanthate feeders. Because speed control must be precise, d.c. motors are essential.

E records the pulp density in the grinding circuit. Measurement is made by the common pressure differential method of submerged tubes. Control is not "automatic" in usual sense, although grinding circuit does run itself. Water additions, determined empirically, are fixed by tonnage fed to grinding circuit.

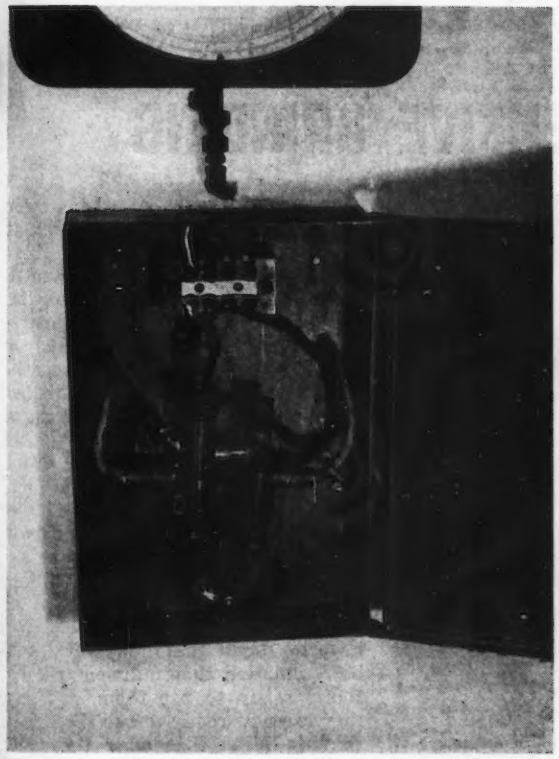
F records temperature, which is important variable at Tennessee Copper. Hot water from smelter is mixed with new water to give a mill pulp temperature of about 80 deg. F.



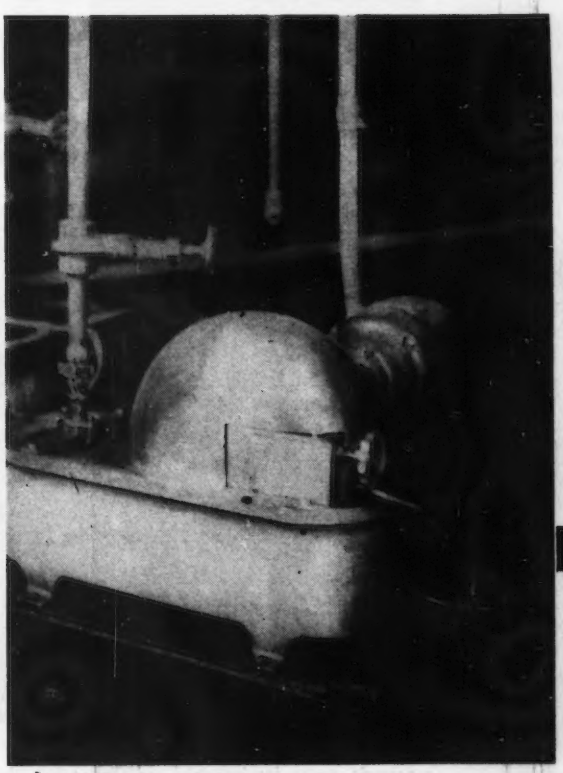
ALKALINITY in copper circuit is recorded on panel at (A), measured by these electrodes in regrind bowl classifier.



ELECTRODES control speed of d.c. motors on these lime feeders, thus secure automatic pH control in copper cells.



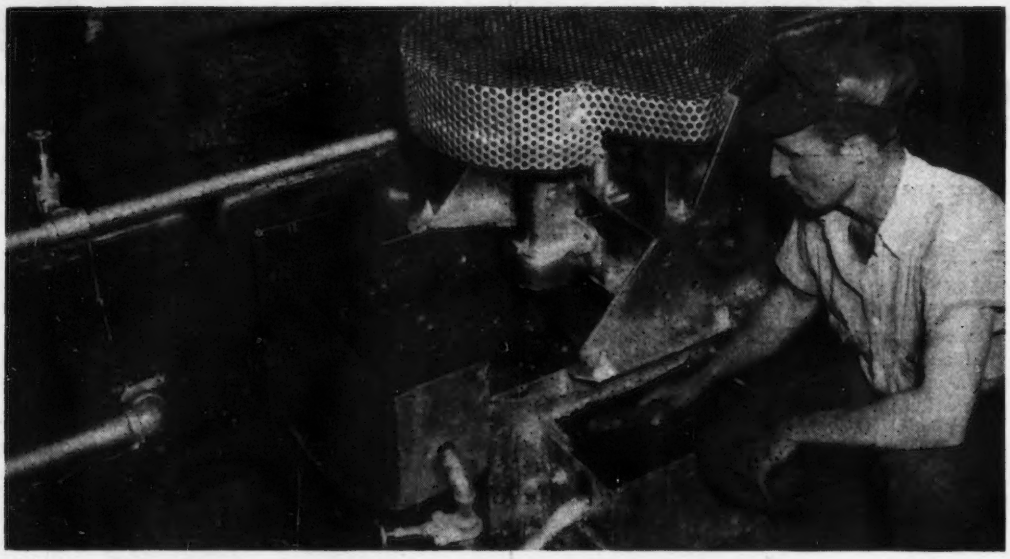
CONDUCTIVITY CELL tests continuous filtered mill pulp sample.



XANTHATE FEEDER'S d.c. motor controlled by conductivity cell.

XUM

AUTOMATIC pH CONTROL works well at London and Isabella in these 10-ft. deep Munro copper cells. H. W. Simonds tests hydraulic system that raises air header and pipes during shut-downs.



PROOF of smooth operation lies in steadiness of small zinc recleaner cell at very end of mill circuit. To please photographer, E. J. Townsend makes wholly unnecessary tailing weir adjustment.

AUTOMATIC XANTHATE CONTROL handles bulk sulphide flotation nicely. Homer Johnson, operator, watches.

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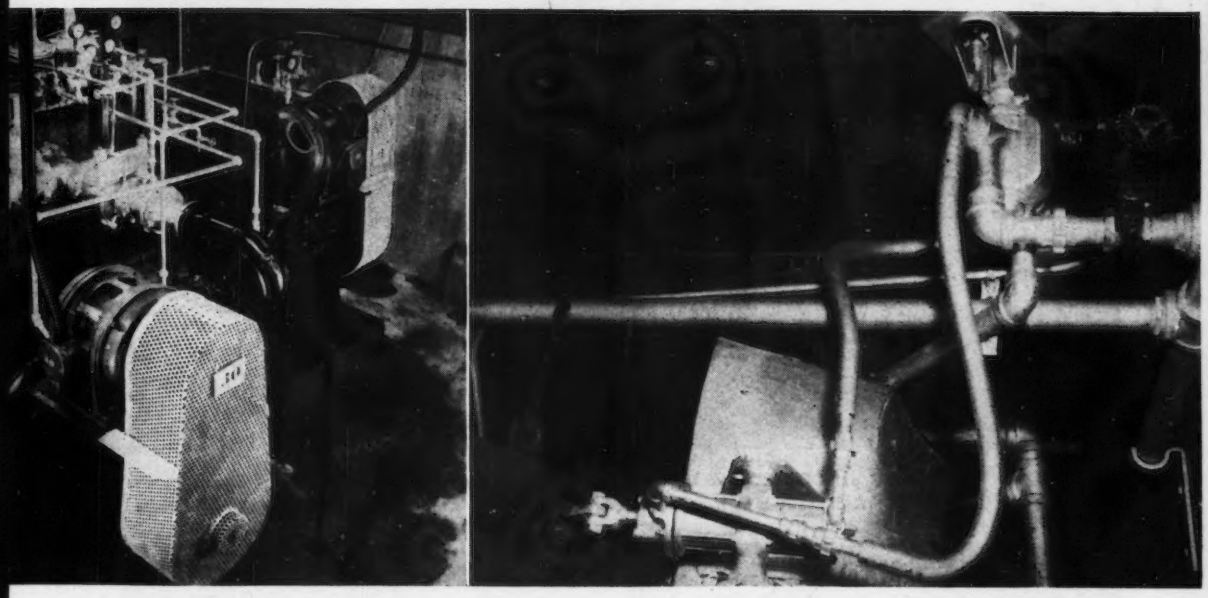


TAILINGS of both mills join at London, are sent to pond by two pumps in series. Protective devices include relay (top right). If power fails, relay opens valve, hydraulic cylinder (bottom) pushes hose to left, incoming Isabella tailing overflows outside, doesn't drown pumps. Gland water control is automatic. Impellers are good for about 225,000 tons milled.

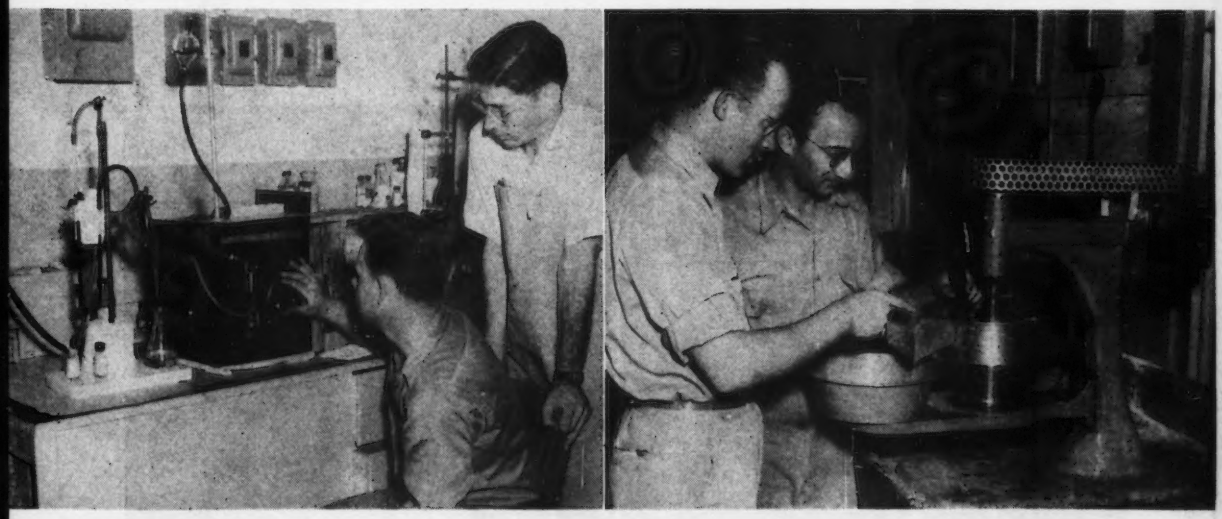
THE IMPORTANCE OF AN IDEA

TENNESSEE COPPER CO. is, as we hope these few pictures have indicated, an unusually progressive organization. The effect of its alert attitude shows up where it counts most, on the balance sheet. It is a fact that one of Tennessee Copper's mills now makes money on ore that broke another company.

The question is: how much of what has been pictured here is applicable to your own milling operation? Can you get as much benefit from such devices as Tennessee Copper does?

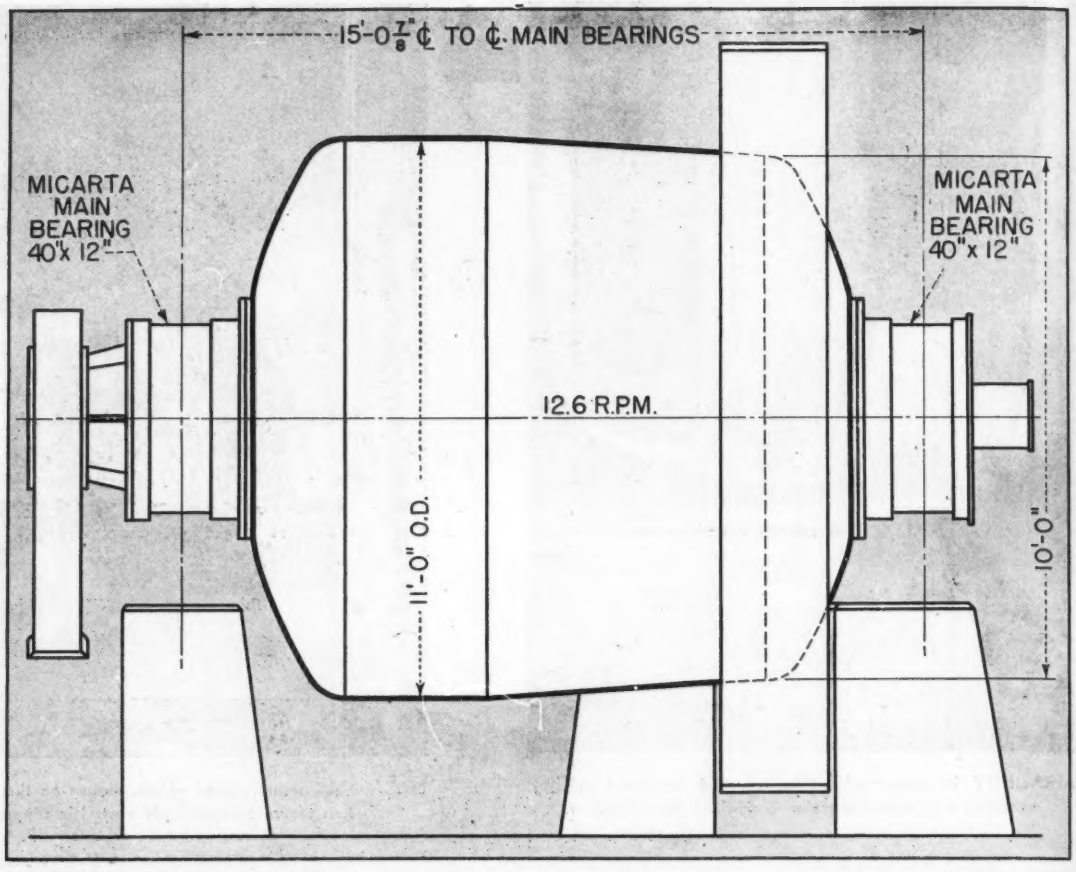
The answer depends entirely on yourself. Many mills were doing some of these things before Jack Myers and his staff tried them. Many mills are doing things differently; some are doing them better. But the important thing to note here is that Jack Myers and his staff were willing to try something new.

After all, these pictures have not presented a technique that you can lift out and use unchanged in your own mill. The details of each operation are different and call for new treatment. These pictures show rather the working of an idea, the result of the willingness to try. These mills of Tennessee Copper, low in cost and high in quality, show what happens when men say, "Let's not stop with what we have. Maybe there's a better way to do it."



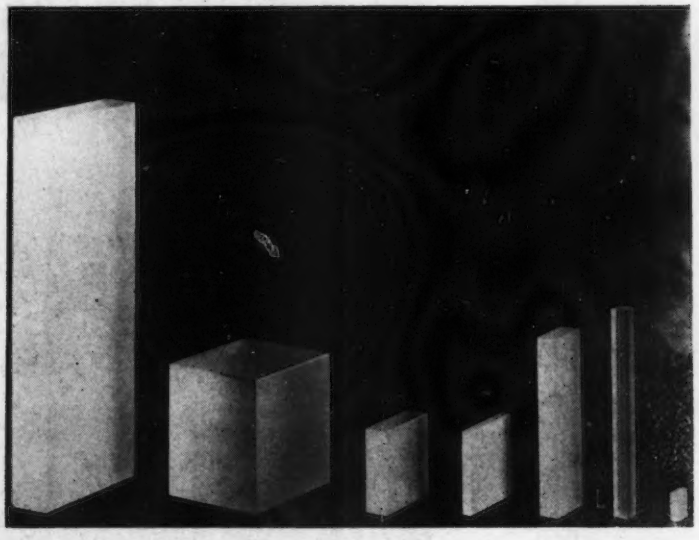
RESEARCH pays at Tennessee Copper. At left, Ely Silverman and Ray Fortner (seated) run polarograph tests. At right, J. Q. Jones (left) and W. A. Arpi, studying oxygen-sulphur flotation reactions, discuss a test.

XUM



MILLS GROW LARGER, as this giant ball mill shows. Being built to replace three smaller ball mills in a 2,000-ton plant, it is overflow-type, will work on rod mill discharge, and will use 1-in. balls. Savings will be in power and in ball and liner wear.

FOR LESS EXPENSIVE GRINDING



NEW IDEAS for grinding center on quartz crystals like these, which are source of supersonic waves for industrial use. Tests show that such waves can shatter ore minerals. The main problem is cheap and large-scale generation of waves.

HERE ARE A FEW of the newer weapons with which millmen aim at lower grinding costs, milling's biggest single expense. These involve larger mills, better grinding media, improved techniques, and automatic control methods, and they do cut costs. Yet, all these ideas are still little more than shavings whittled from the edge of the central mass of the problem.

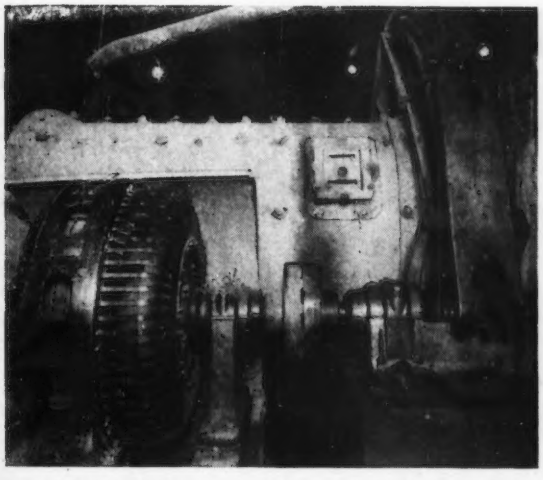
What is needed is a different and better "grinding" method. One such way may be developed out of the quartz crystals at the left, now used in tests in several laboratories. Other ways may lie in extending the field of crushing, or in use of ultra-hard grinding media. We have no doubt that new ways will be found, and that millmen will be found ready to use them, just as they are now ready to use the edge-shaving ideas that offer the only immediate road to a better job of grinding.

TWO WAYS TO GRIND

For Plus 600 Ton Mills There Is This Choice

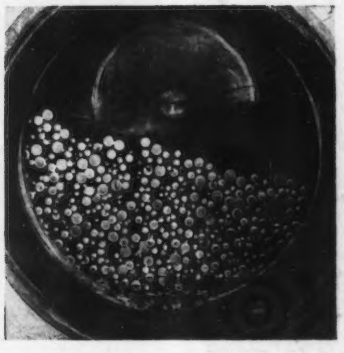
1 FIRST WAY puts crushed ore through rolls or tertiary fine crusher to feed single-stage ball mill grind.

2 GRATE MILLS, with rationed ball charges, in this method have increased capacity for many, cut costs for some.



1 SECOND WAY uses two-stage grind. Rod mills do fine crushing, have some sizing effect, make excellent ball mill feed.

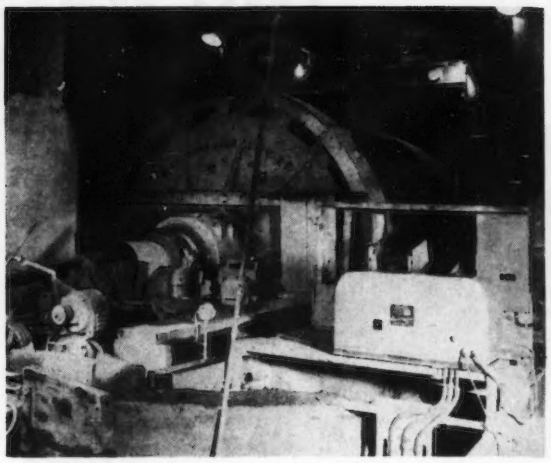
2 BALL MILLS, possibly overflow type, need only small balls. Easy to operate, this method has good cost record.



EVERY OTHER ONE of the 34 rod mills in International Nickel's 850-ft. grinding aisle will be converted from rods (center) to balls (right). Flow will be through rod mills, then to closed-circuit ball mills with 1½-in. balls. Aim is less sliming, less power and steel costs.

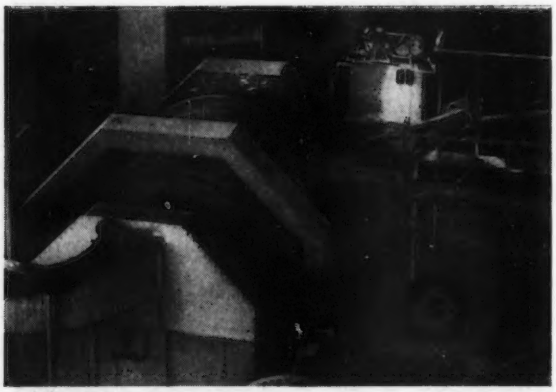
(Continued on next page)

THIS IS THE OLD WAY, and in more and more mills, this old familiar pulp balance is giving place to better methods.

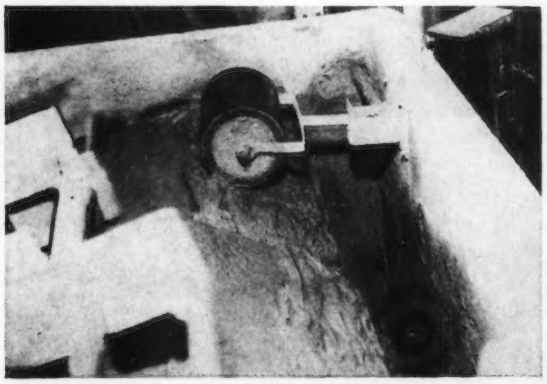


NEW DEVICES control this grinding circuit's pulp density, hold maximum mill tonnage, decrease liner and ball wear.

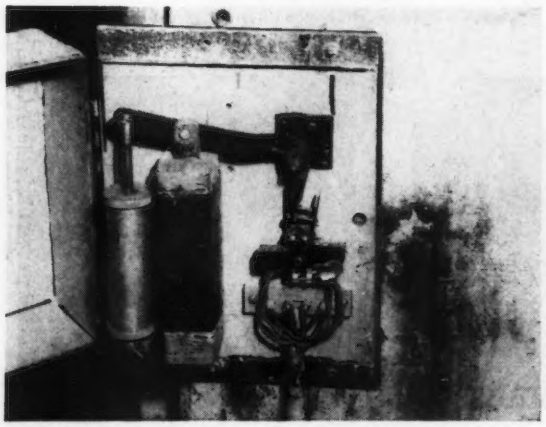
NEW METHODS OF GRINDING CONTROL



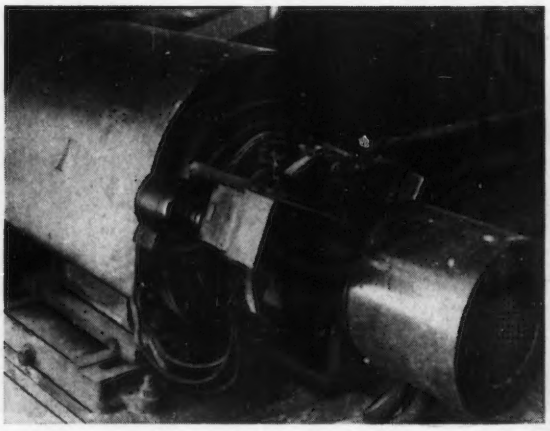
1 CASTLE DOME uses electrical control to measure load on classifiers, adjust water valves, keep load constant.



2 UTAH COPPER DIVISION of Kennecott places roller in classifiers to ride on sand ribbon returned by rakes.



3 ROLLER of photo 2 adjusts this switch control that varies classifier rake speed through drive motor of photo 4.



AUTOMATIC CONTROL of drive motors at Utah gives steadier classifier operation than did manual control.

CAST OR FORGED BALLS?

CAST BALLS for grinding have been cheap to use if plenty of scrap iron were available at low cost. But scrap is no longer plentiful or cheap, and those who once chose cast balls on a cost basis will probably re-examine that decision.

One large copper mine is testing alloyed white cast iron balls against unalloyed balls. The alloy is martensitic white iron with 4½% nickel and 2% chromium, chill cast. The alloy balls have been wearing about twice as long as the unalloyed balls, and about 25% longer than some forged steel balls.

FORGED ALLOY STEEL balls not only often compete successfully with cast balls, they even compete with themselves. One large foreign copper mine for years had imported steel billets and forged its own balls. Then recent tests showed that the home-forged balls lost 1.6 lb. per ton of ore ground; imported copper-molybdenum forged balls lost 1.06 lb. per ton. Not only that, importing balls permitted elimination of about 36 man-shifts daily during the time each month that the ball plant would have run. The imported balls, rationed in three size groups, are now used.

PRE-CONCENTRATION

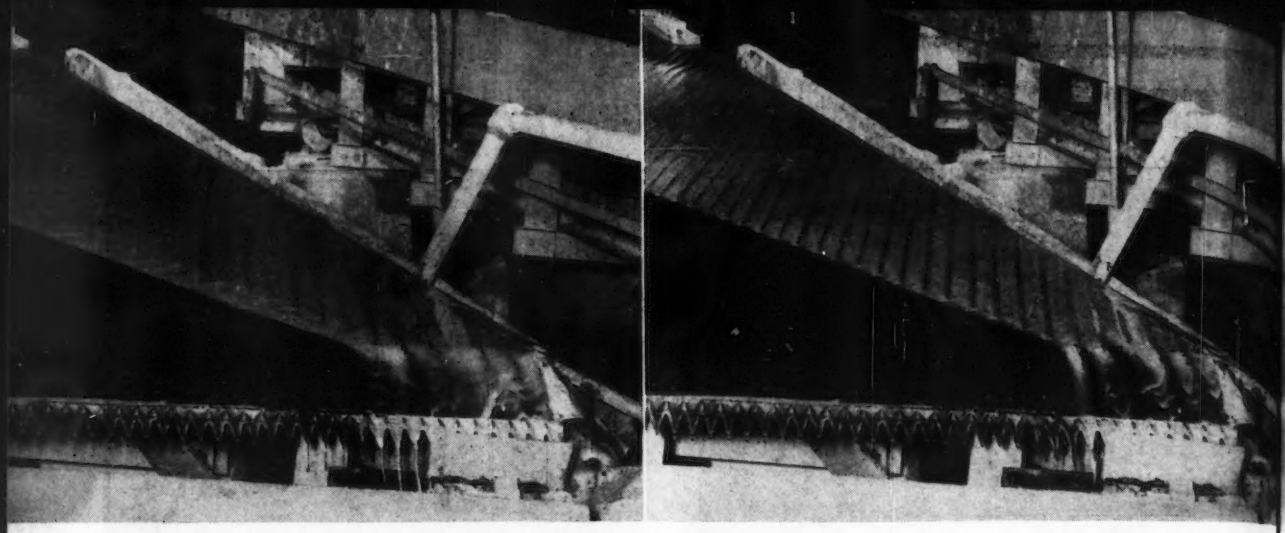
THE EASIEST WAY to cut grinding costs is to cut the quantity of rock that has to be ground. This is a simple idea, yet one that may be overlooked. These pictures show the idea at work cutting the grinding costs of a certain base metal mining company.

The photograph at right shows coarse-crushed mine ore entering a sink and float cone, the density of the medium in which is set to make a separation between a clean tailing and a low grade concentrate, which goes on to a grinding circuit and flotation.

The photograph below left shows the "float" product leaving the cone on its way to the rock pile. It is barren and the mill is through spending money on it.

The photograph below right shows the "sink" product. Reduced in bulk, richer, this concentrate is less costly to grind and makes better flotation feed.

XUM



NEW VARIABLE in table operation appears above. Pictures show same deck, treating same zircon-limonite-silica ore under identical conditions, except stroke kick is sharp at left, mild at right. Note that some in-between setting would give best results.

SEPARATION

THE TOOLS ARE THE SAME BUT THEY DO A BETTER JOB

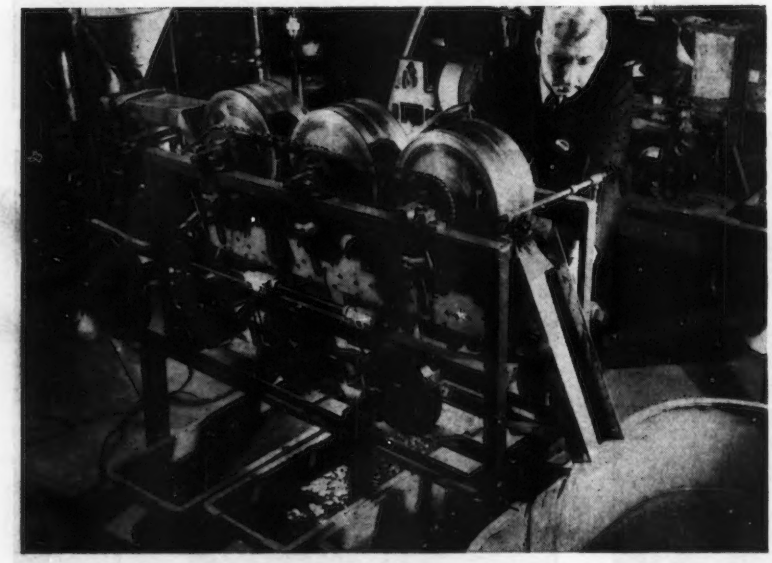
MINERAL DRESSING progresses in a steady sort of way and very rarely indeed will we see anything as revolutionary as the advent of flotation. Millmen must, therefore, center their interests at present on new applications, and techniques, developed for using what are pretty much the same old tools that have been around for years.

For example, gravity concentration, far from being knocked out by flotation, is right back in the center of the ring. With Humphreys spirals, the D. S. M. Cyclone, and various new jigs and tables, gravity methods move boldly into the 28 to 200 mesh territory of flotation. Note also the new table technique shown above, and the collection of new gravity methods for iron ore treatment pictured opposite.

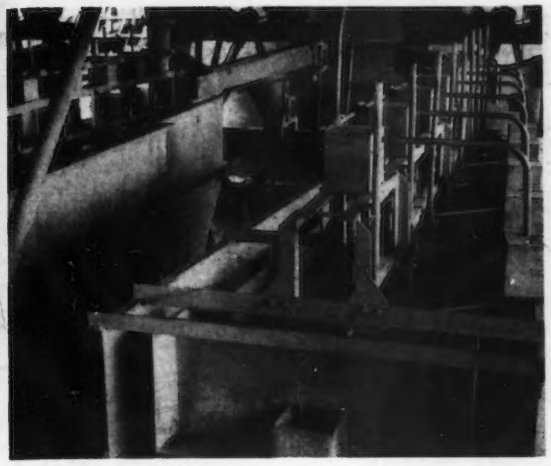
Magnetic separation, too, finds itself in a new spot in the grinding circuits of the proposed Iron Range taconite plants. Operating like unit cells, the magnetic separators will take ball mill discharge and reject a clean non-magnetic tailing. Their magnetic concentrate will go to classifiers, which return coarse mineral to the ball mills and overflow a high grade fine product.

Although at least two manufacturers are about to announce new flotation machines, there seems little chance for any fundamental change in machine design for quite some time. Hope for greatest improvement right now is in flotation reagents and in methods of handling them. (See page 153.) The industry does not hope for a reagent that would increase recovery of copper, for example, because the range of possible betterment is extremely small. But anyone offering a reagent that would make an equivalent recovery and cost a lot less than present reagents would be welcomed in most mill offices. Millmen are extremely cost-conscious these days.

To sum it up, the greatest advances in mineral dressing in the near future seem likely to appear in automatic controls, new applications of reagents, and new jobs for old tools. But there is also considerable evidence to suggest that another revolution in milling technique is not far over the horizon.

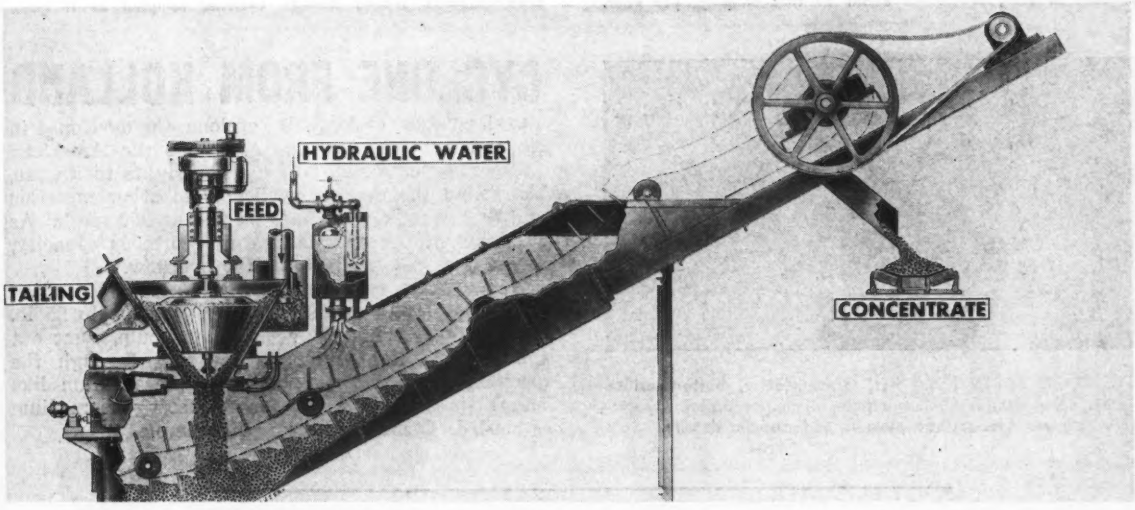


MORE laboratories test magnetic separation, seeking new techniques for taconite.

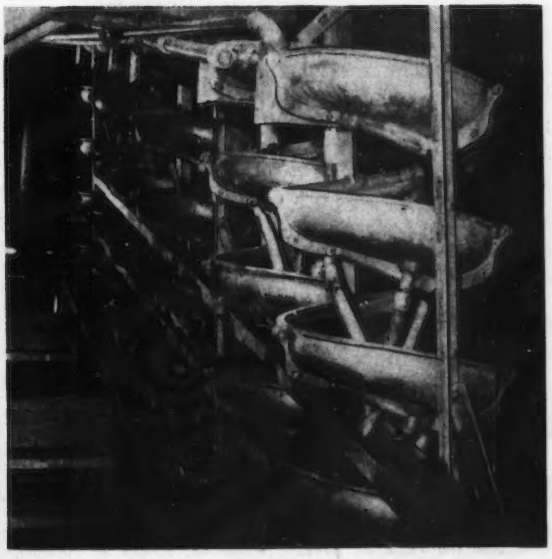


THIS SIZER, widely used, works best on minus 20-mesh ore.

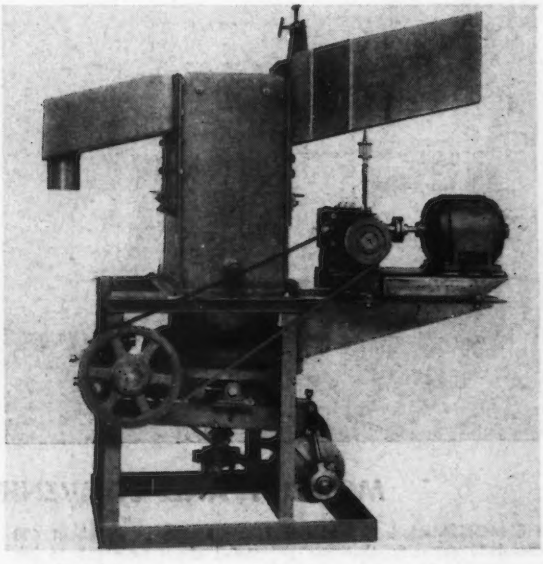
SCREW CLASSIFIER turns out to make good Heavy-Media cone.



INGENIOUS separator for minus ⅜-in. ore, uses pulp itself as heavy medium, washing action comes from rotating inner cone.



WORM-LIKE SPIRALS quietly at work on Butler Brothers' ore.



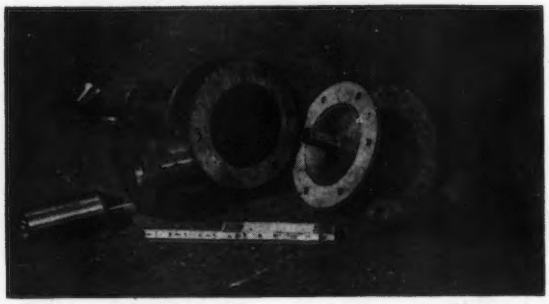
ADAPTABLE iron ore jig tests widest speed, stroke ranges.

(*Continued on next page*)

XUM

LARGE capacity in small space. This 6-in. cyclone can wash 10 tons of coal, or thicken about 50 tons of pulp, per hour.

TESTS on cyclone use this 3-in. unit. Pulp is dumped into cone, pumped around through cyclone, sampled as it goes.

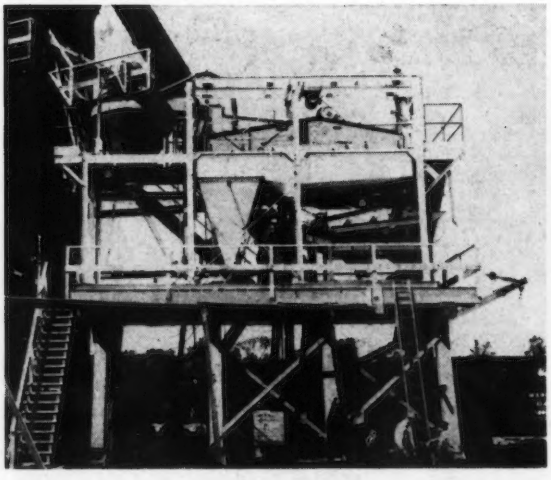


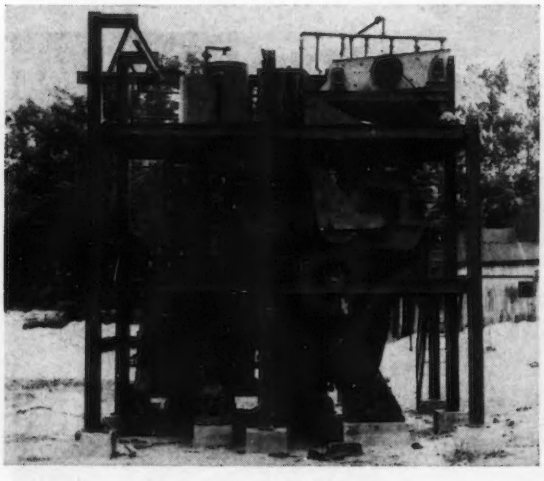
CYCLONE'S PARTS (from left) are: injector, bottom orifice (rear), cone, central discharge pipe, discharge casing. Operating variables include pressure and medium density.

CYCLONE FROM HOLLAND

THE DRIESSEN, or D. S. M., cyclone was developed in Holland for washing fine coal, but the American Cyanamid Co., which now has the rights to its use, has found the cyclone applicable to other minerals and to separations perhaps as fine as 200 mesh. As a thickener, the cyclone has an enormous capacity, but it does not produce a clear overflow.

The cyclone operates by reason of the rotation within it of pulp injected at pressures up to 25 lb. or so. Heavy minerals, or thickened pulp, come out the bottom; light minerals rise out through the discharge pipe. For concentration, a medium like magnetite must be used; for thickening no medium is needed. Operation seems quite simple.





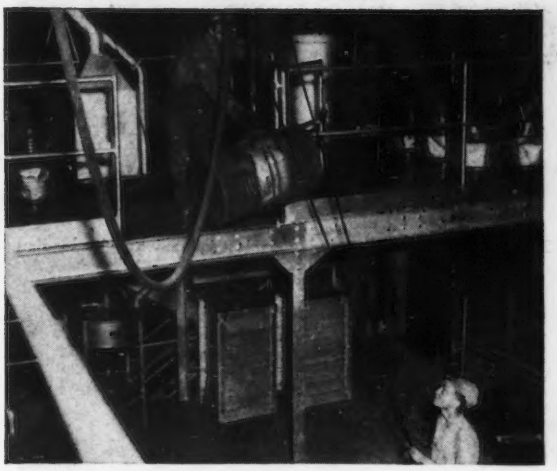
MOBILITY AND CONVENIENCE FOR SINK AND FLOAT

THE MOBILMILL is a complete Heavy-Media plant, about 400 tons daily capacity, that can be moved about from job to job as required. Shown above treating copper ore, Mobilmills are also working on fluorspar and lead-zinc ores at several mines.

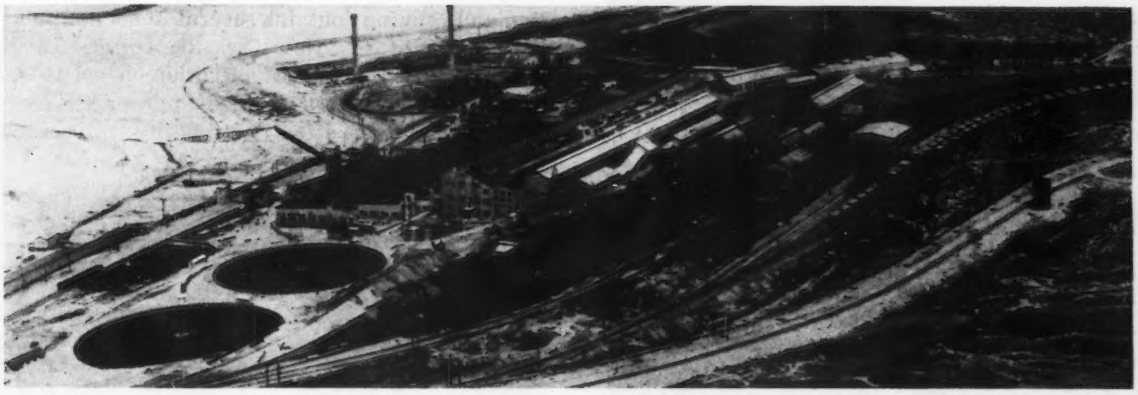
PACKAGE PLANT, a complete, easily-erected sink and float unit, uses the H. & H. process, which has galena as medium. Capacity is roughly 10 tons per hour. First of these plants will treat fluorspar in Kentucky; others will go abroad for lead.

BETTER REAGENT HANDLING SAVES MONEY

CYANIDE cans are dumped safely into this hooded mixer.



SMALL AIR HOIST quickly lifts xanthate cans to mixer floor.



THICKENERS can simplify operation by smoothing out variations in float feed between classifiers and cells, as these two do at Magna mill.

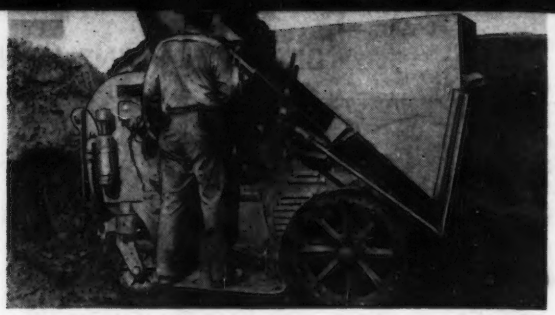
TWO IDEAS FOR MILLMEN

DIFFERENTIAL DENSITY in Heavy-Media cones can be recorded by two tubes sunk to different depths in medium. Air, indicated in glass jars, bubbles through tubes at same rate of flow. Pressure difference registers on meter. This is Eagle-Picher's idea.

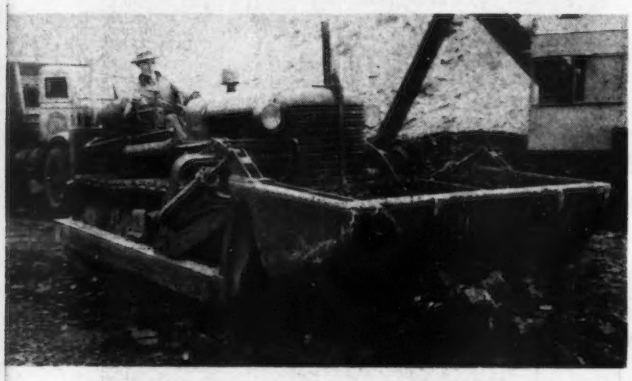
ROTAMETER for measuring water flow in pipes is great help in any mill. Float in graduated glass tube rises as flow increases, gives accurate reading in g.p.m. No need to try to count turns of valve, or to tie strings to valve wheels to get right setting.

XUM

SCOOP TRUCK has proved very efficient in loading and unloading boxcars for large mining and smelting company.



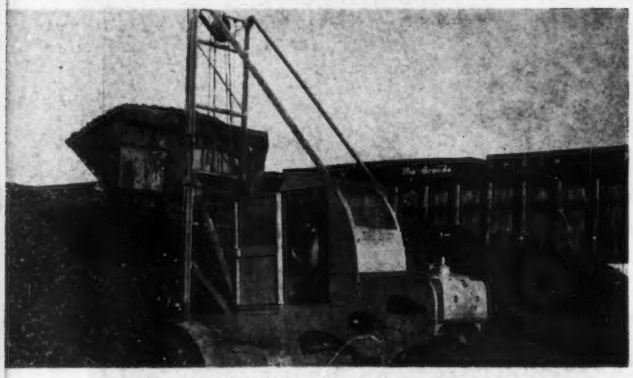
RUGGED SHOVEL, like underground prototype, handles wet material or large lumps. Useful loading or unloading boxcars.



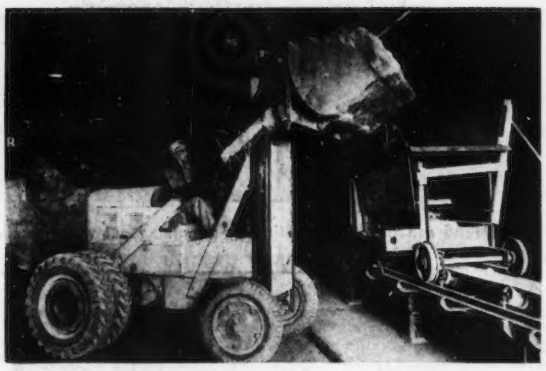
COMBINING the usefulness of a bulldozer with ability to pick up load, this special shovel is adapted to many needs.

REDUCTION AND REFINING

THIS SURVEY of modern developments in reduction and refining contains several items not published heretofore. However, the editors have included several items which although not new, in their opinion have not had appropriate recognition by the smelting and refining fraternity.



RUBBER-TIRE SPEED, high lift, and large scoop give this earth mover an advantage unloading at a distance.

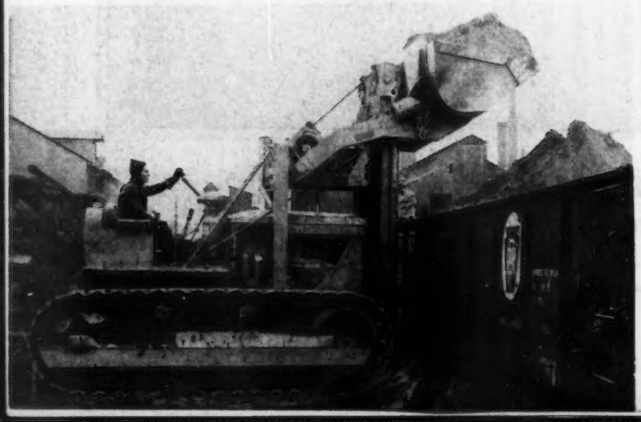


VERSATILE LOADER has been put to many uses in yards and plants, handling various kinds of material.

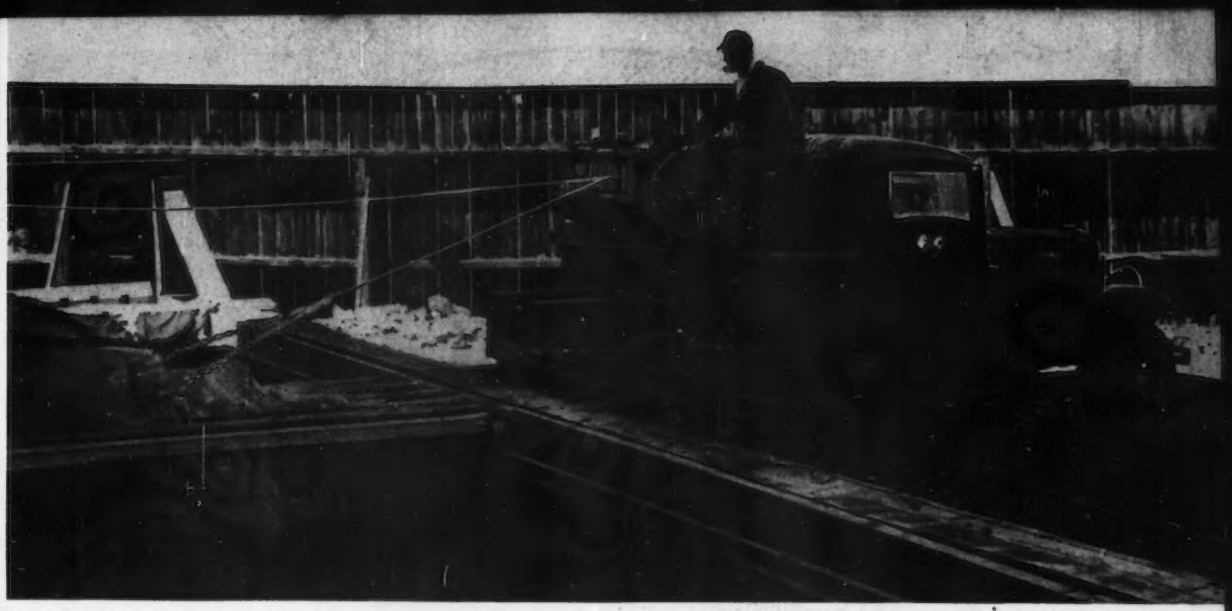
BETTER MATERIALS HANDLING IS AN OUTSTANDING

HIGH LIFT and rugged construction, with crawler-tractor traction, make this excavator able to dig and load various kinds of material and pull heavy loads.

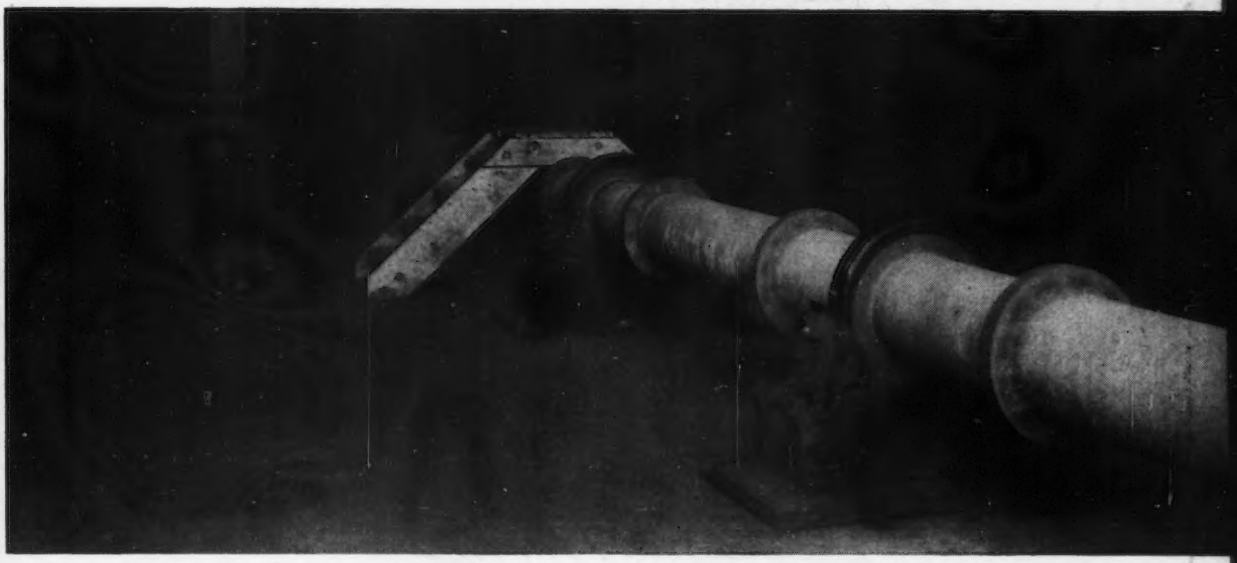
P. 154



CRAWLER-TRACTOR traction, rugged construction, and ability to do loading and unloading without turning around, plus truck-height lift, characterize this special loader.



SCRAPER-HOIST, mounted on truck, can be set up at various places in yard or plant to move raw materials or products into piles, bins or hoppers, and to scrape out furnaces or flues. Can also be dismantled for separate use of truck.

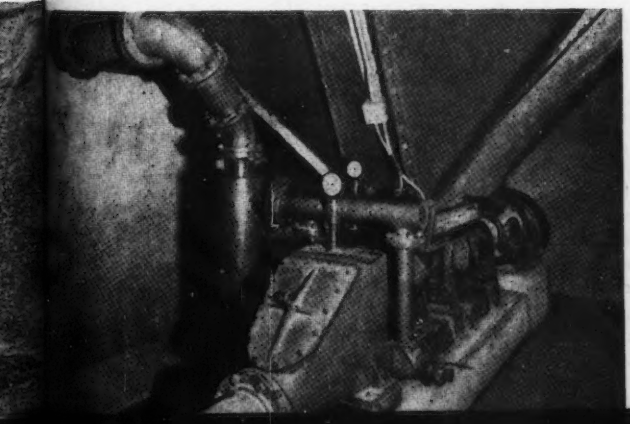


ROTARY TUBULAR CONVEYOR, with internal screw flights, has advantages of simplicity, accessible working parts, low maintenance, and minimum down-time, plus ability to handle hot or dusty material, and to conserve heat or function as cooler.

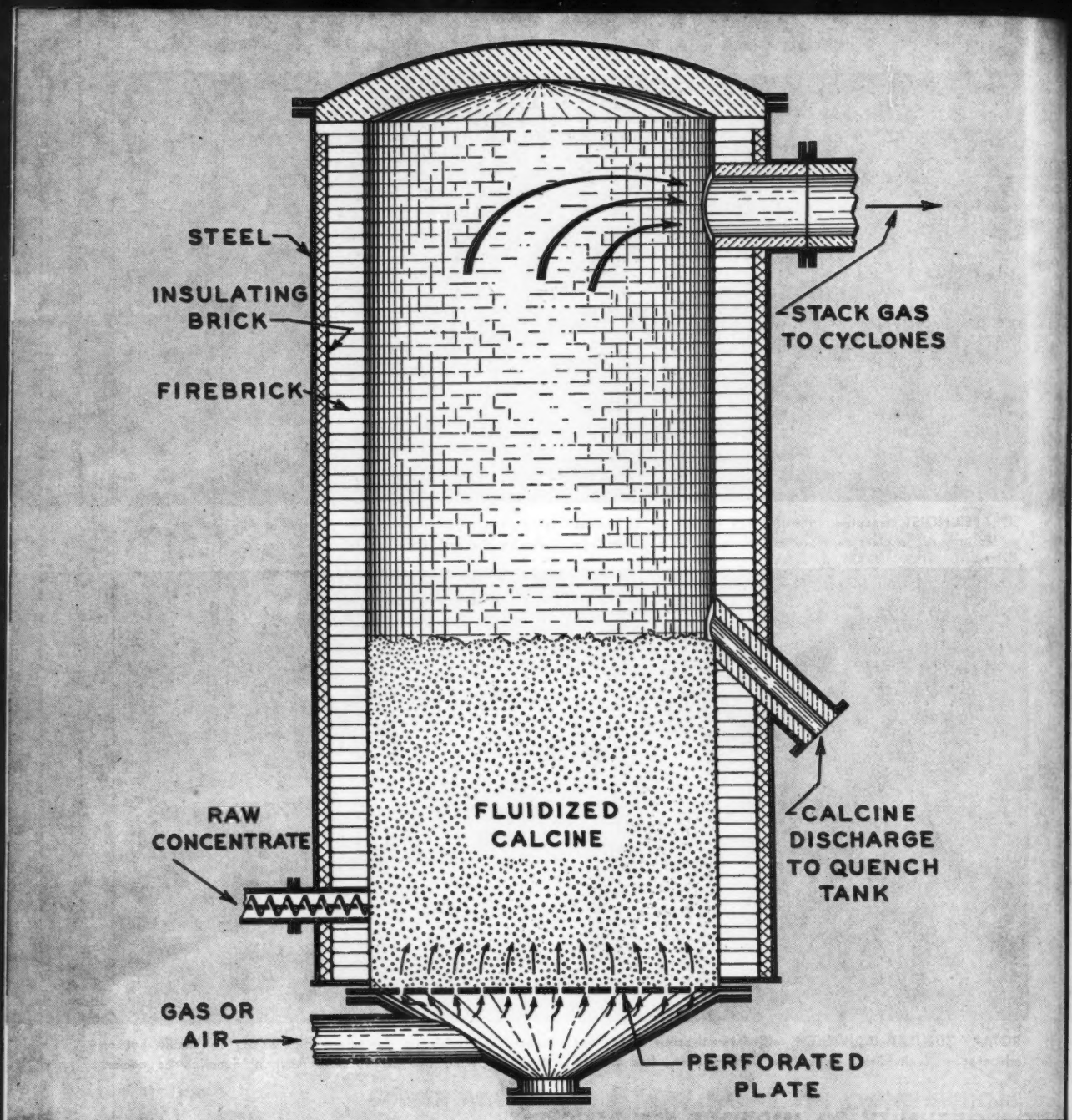
OPPORTUNITY TO IMPROVE EFFICIENCY

FOR CLEAN, labor-saving transportation of dry, granular or pulverulent material, pipe-line conveying, using air pressure and a screw-feed "gun," provides capacity up to 300 tons per hour, lift up to 500 ft. and range up to 5,000 ft. The rubber-tired "gun" at right is self-propelled and remotely controlled for loading from piles, boxcars, or barges.

P. 155



XUM



FLUOSOLIDS PROCESS

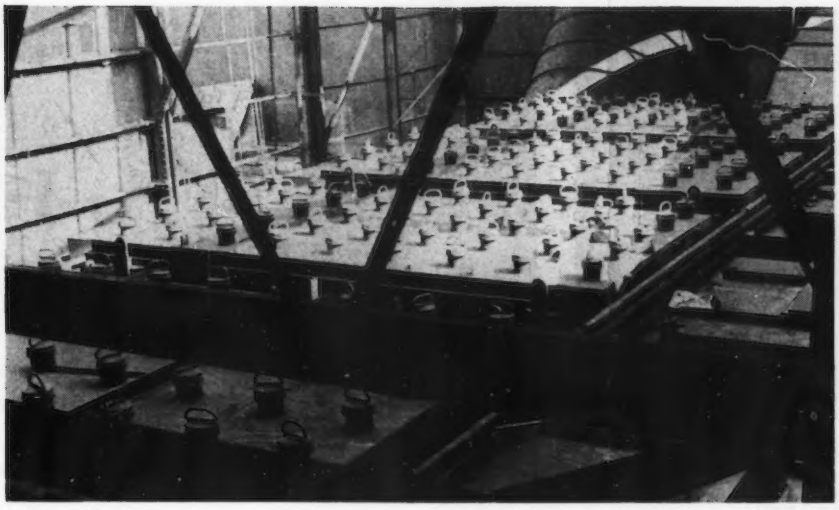
THE DORRCO FluoSolids process, revealed here publicly to mining and metallurgical engineers for the first time, depends upon the fundamental principle of carrying out a gas-solid reaction in a dense suspension of the solids, maintained in a turbulent mass by the upward flow of the gases that effect the reaction. This mass assumes a fluid level and acts as a fluid.

The process has been applied successfully to such widely varying operations as the roasting of arsenopyrite concentrates, and the calcination of limestone and lime sludges. Successful tests have been concluded on the roasting of various other ores, on the reduction of metal oxide ores and on the calcination of other carbonates.

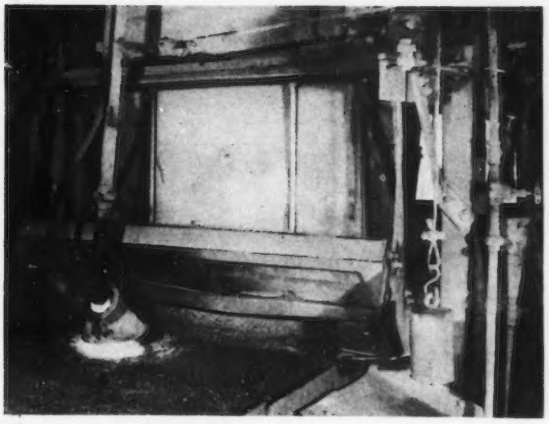
The use of this technique is believed to promise significant improvements in many industrial operations, besides those mentioned above, which involve the treatment of solid particles with gases at elevated temperatures. Its use is said to be especially attractive where process fuel is an important cost item; where close temperature regulation is essential; or where the composition of the gas must be maintained within narrow limits. The only important limitation is that it must be possible to effect the desired reaction at a temperature that does not soften or sinter the solids.

The Dorr Company, sponsor of FluoSolids, is licensed under appropriate patent rights of Standard Oil Development Co., and has devoted three years of research to solving the many problems that obstructed commercial use of the process.

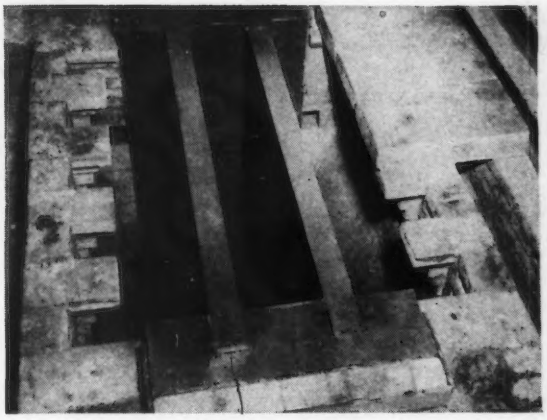
For the first detailed account of the FluoSolids process to be published, see Chemical Engineering, December, 1947.



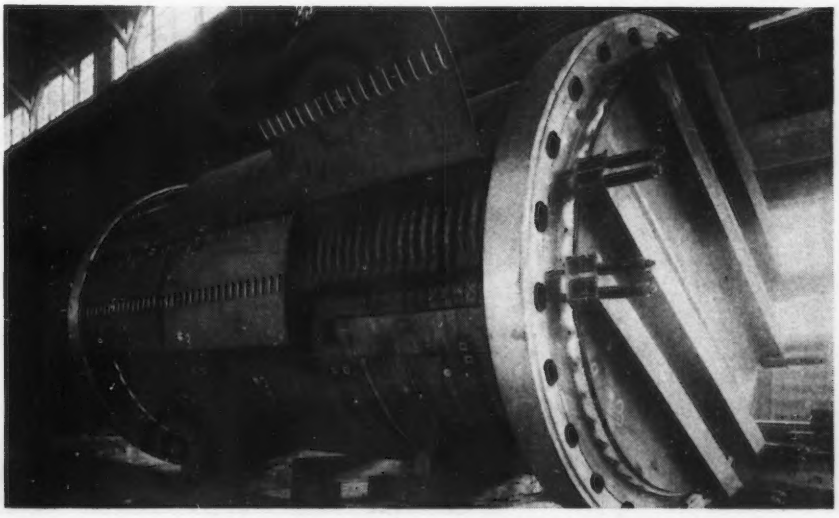
TO SAVE SPACE, leaks, and losses, and the labor cost of cleaning out tunnel-type flues, roasting, sintering, furnacing, and converting operations are gravitating more and more toward the use of multi-cyclone dust collecting equipment, bag-houses, and electrical precipitation of fine dust and fume. We anticipate that the use of these installations will mount, and that there will be more employment of the equipment in series, the multi-cyclones removing the coarser dusts, and the bag-houses or electrical precipitators downstream catching the finer sizes. The eventual goal is complete dust and fume recovery.



SWINGING IGNITER, developed at Consolidated smelter, Trail, B. C., improves sintering and lowers fuel costs.



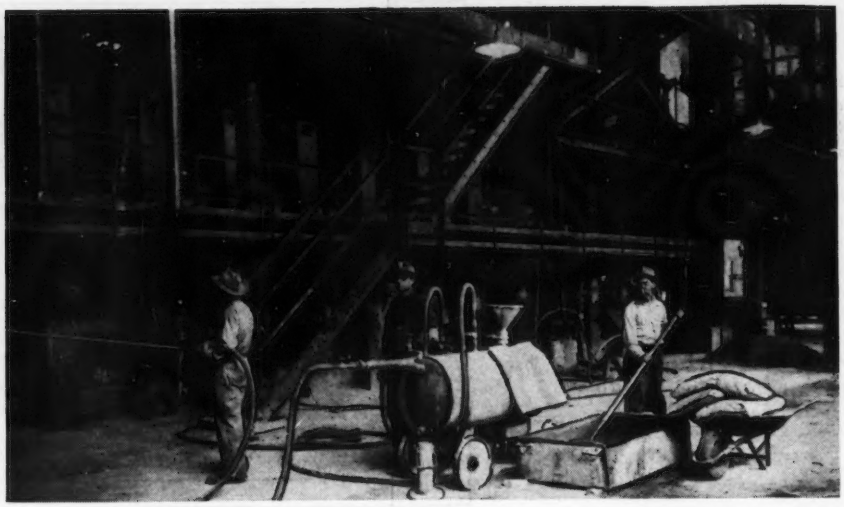
NEW JERSEY ZINC continuously-operated vertical retort has labor-saving and comfort advantages over horizontal type.

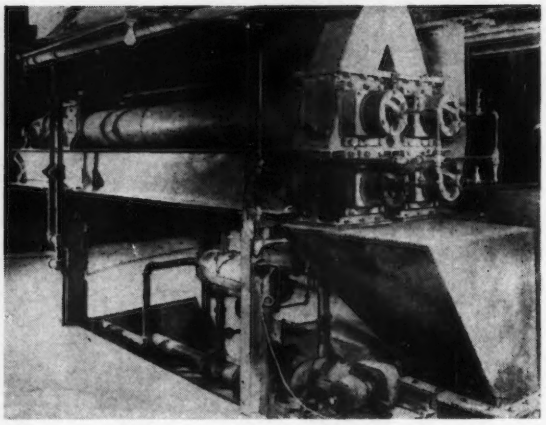


TREND IN COPPER converter construction has been toward larger sizes, larger stack outlets, full-circle turning, removable plates protecting tuyere valves, removable panels for quicker patching, and placing riding rings at ends to give full access for tuyere punching.

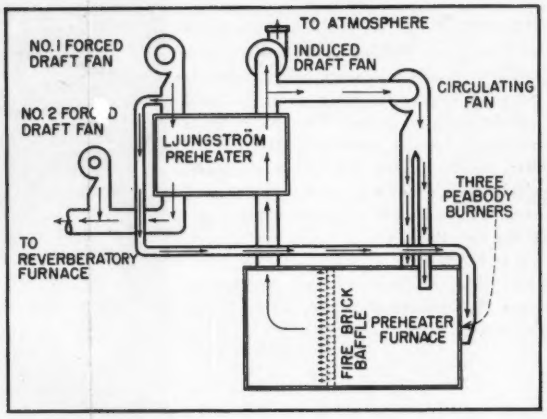
SUSPENDED-ARCH reverberatory
States, have proved very satisfacto
and Copper Cliff. This type of fu

SILICA-SLURRY hot patching, developed by Phelps Dodge Corp. (A.I.M.E., T.P. 995) has been an invaluable contribution toward prolonging sprung-arch reverberatory furnace campaigns. The slurry is placed in a portable pressure vessel and "gunned" with compressed air through a long pipe and nozzle. Slurry can be prepared in a ball mill and stored in an agitating tank, or can be made up on the spot from finely ground refractory material. Best technique in hot patching seems to call for repeated applications of very thin layers of slurry to interior brick-work. If applied too thickly, silica may soon spall off.

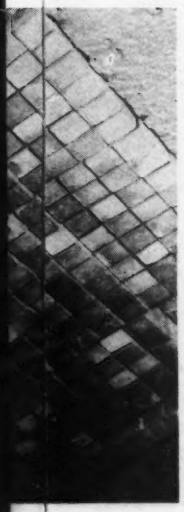


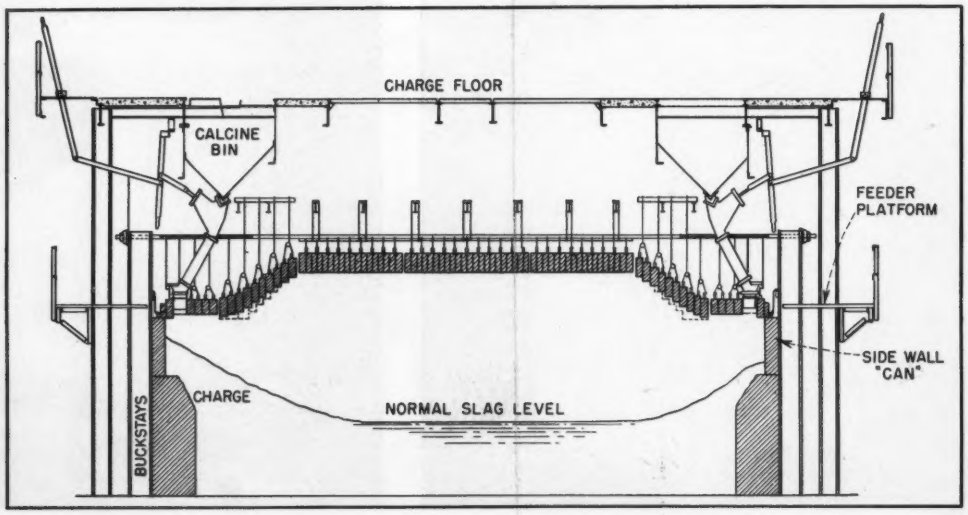


DOUBLE WATER-JACKETED screw-feed cooler for dusty and granular material does job cleanly and in small space.



PREHEATER, used on Kennecott's Chino smelter reverberatories, has made improvement in over-all fuel conservation.

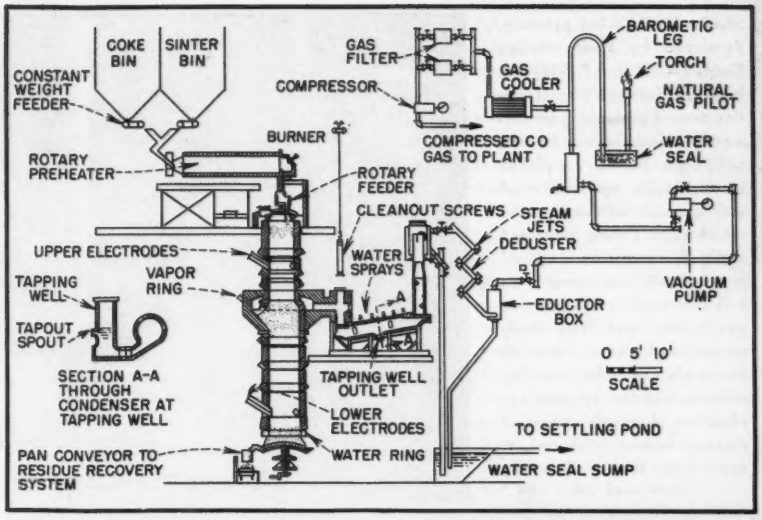




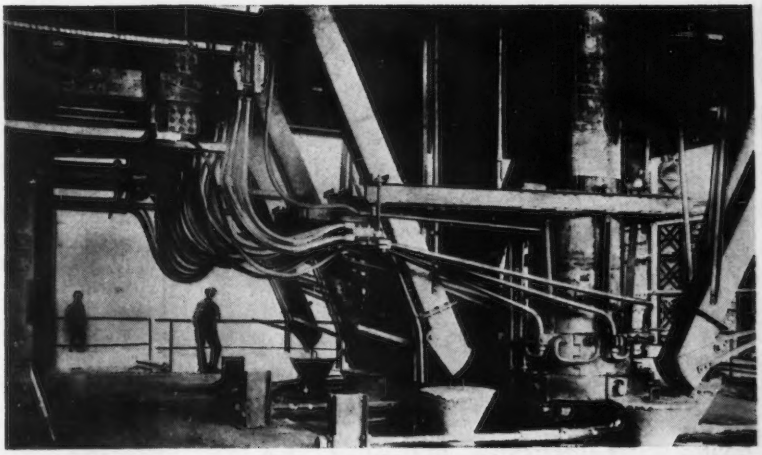
...ator furnaces, although not popular in the United ...factry to their Canadian users, at Flin Flon, Noranda, ...of furnace has eliminated down time for roof and wall repairs, has given lower repair costs, and has enabled widening and changing contours without shutdowns. Newer features are used of beveled brick in sloping faces, at Noranda, and hanging only alternate pairs of brick in cans, at Flin Flon.

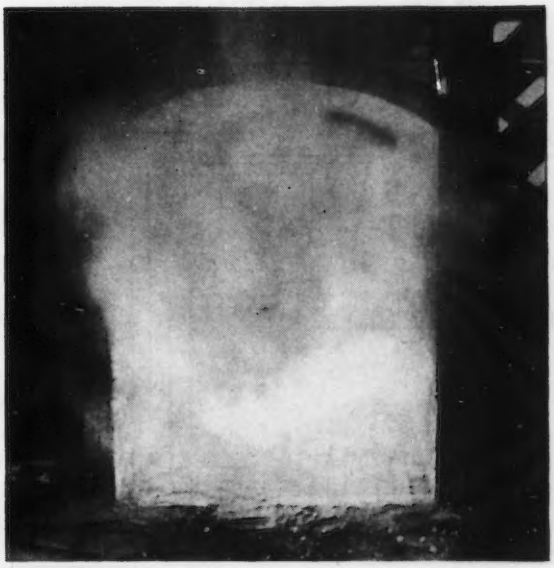
XUM

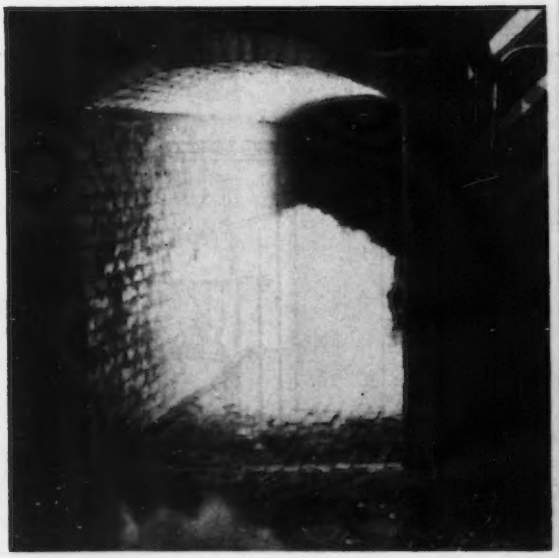
ELECTROTHERMIC, continuously operated reduction of zinc, as practiced at Josephtown, Pa., by the St. Joseph Lead Company, seems likely to receive greater attention in the future because of greater availability of low-cost electric power and increasing difficulty in obtaining labor for horizontal-retort plants; also because the electric furnace lends itself to close control of furnace atmospheres. This type of furnace is also being applied to continuous fuming of lead slag at Herculaneum, where the operators are confident that the few remaining "bugs" will be ironed out in a short time.



ELECTRIC SMELTING of copper, as done at Outokumpu, Finland, lends itself to competitive production costs where electric power is cheap, to richer gases for acid making, to long furnace life, and to close control of furnace conditions. This furnace uses the Soderberg self-baking electrode, which is replenished by stuffing batches of component materials into sheet-metal "cans" at the top, the electrode being continuously fed to the furnace as consumed at its lower end. This type electrode was applied to some Hall-process aluminum plants during the war.



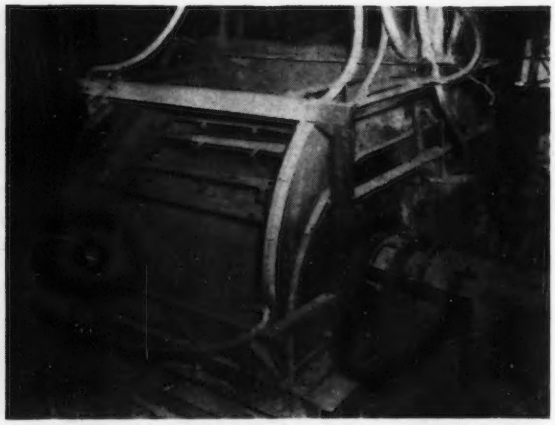




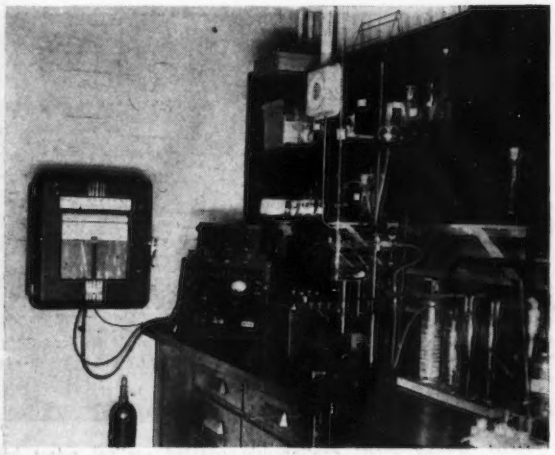
OXYGENATION of roaster, furnace, converter, or fuming-plant air promises to be an aid to the smelter and acid producer. Made practicable by cheap oxygen and pioneered in the steel industry, oxygenation is being practiced at one fuming plant and will be tried in lead blast furnacing. Illustrations show experimental flames with and without oxygen.

XUM

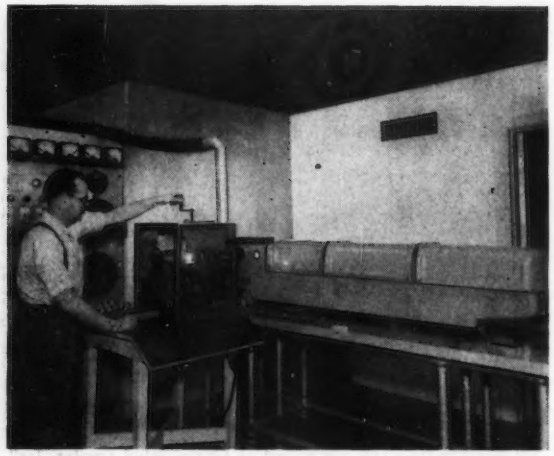
REVERSE LEACHING of zinc, developed by Singmaster & Breyer, and used by American Zinc, is advantageous with high iron or silica, makes thickening easier, and produces good filter cake.



TWO-DRUM FILTER, with reservoir above and between drums, has advantage of picking up the coarser particles first and fines later, giving better cakes, less blinding.

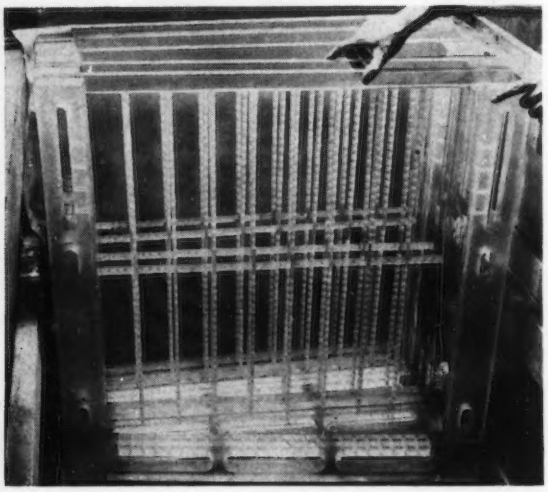


POLAROGRAPH, an analytical device useful in many instances, provides a quick method of accurately determining the composition of materials, solutions, or products.

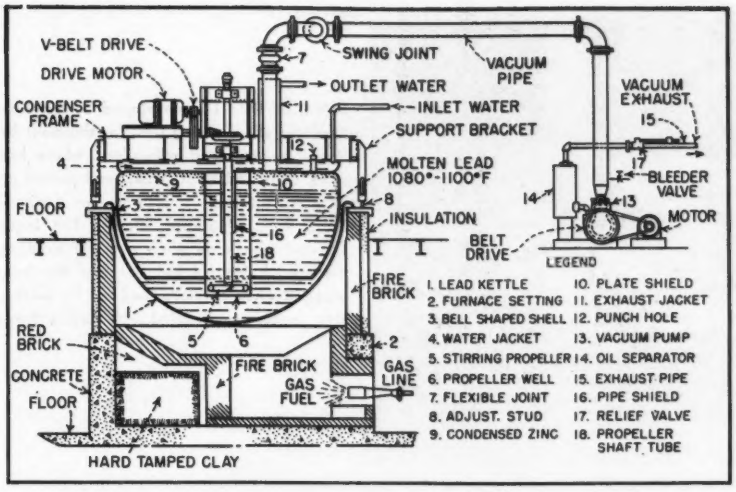


SPECTROGRAPHIC ANALYSIS, as used at Sullivan zinc plant, has proved to be valuable in production control and final analysis of very high purity metal (A.I.M.E., T.P. 2066).

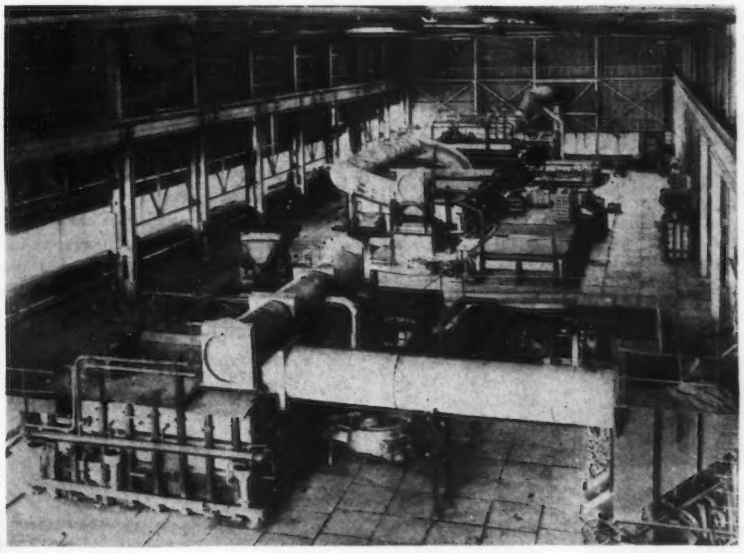
MERCURY-ARC RECTIFICATION, shown here in Alcoa's Vancouver, Wash., plant, has advantage of less space, lower first cost and much lower operating and maintenance costs.



PLASTIC MATERIALS are being used for better dams and spacers in electrolytic cells, and for longer lasting filter cloths when exposed to corrosive or hot solutions.



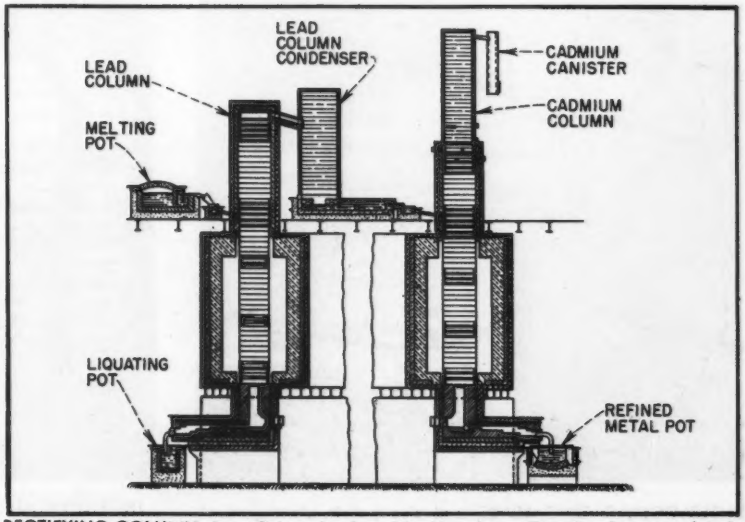
VACUUM DEZINCING of lead, developed at Herculaneum plant of St. Joseph Lead Co. (A.I.M.E., T.P. 2138), has proved to be thoroughly practicable. The molten lead is placed in a large kettle, covered and subjected to vacuum, zinc condensing on the inside of the cover. Vacuum is also an important feature of the Pidgeon process, developed during the war for production of magnesium by reduction with ferrosilicon.



CONTINUOUS REFINING of lead, as practiced by Broken Hill Associated Smelters, Port Pirie, South Australia, possesses certain definite advantages over batch refining. For example, lead bullion may be softened continuously, and in the process antimony, arsenic, and tin may be removed by drossing. Reactions in both batch and continuous process result in slagging arsenic and antimony by preferential oxidation. However, use of continuous, rather than batch, process eliminates the following sources of lost time: filling batch furnace, heating furnace, cooling again to skimming temperature, skimming, emptying the furnace. Also because continuous bath is always low in arsenic and antimony, new bullion oxidizes faster than in batch job. Port Pirie's continuous refining reverberatories appear at left.

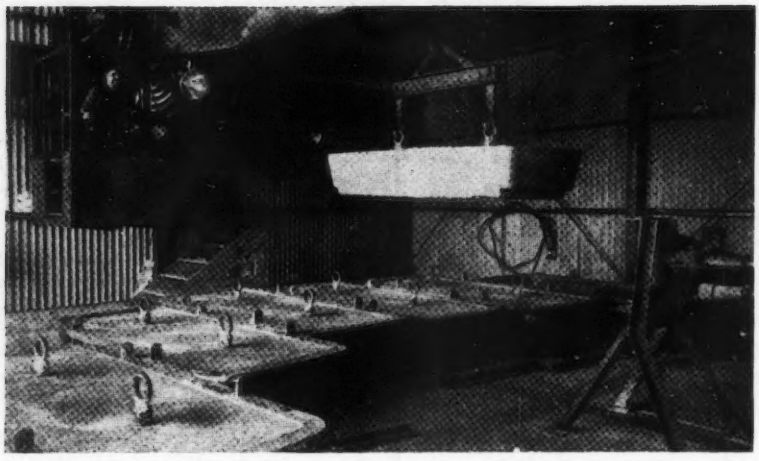
Soda Treatment of Lead Drosses

SODA TREATMENT of lead drosses, developed by American Smelting and Refining Co. (A.I.M.E., T.P. 2139), has proved to be a consistent, simple method of producing high-copper, low-lead speisses and mattes under various conditions. The process eliminates the need of requiring shippers to remove copper from concentrates, and offers several operating advantages, including lower dross-furnace temperatures, longer furnace life, and less run-around.

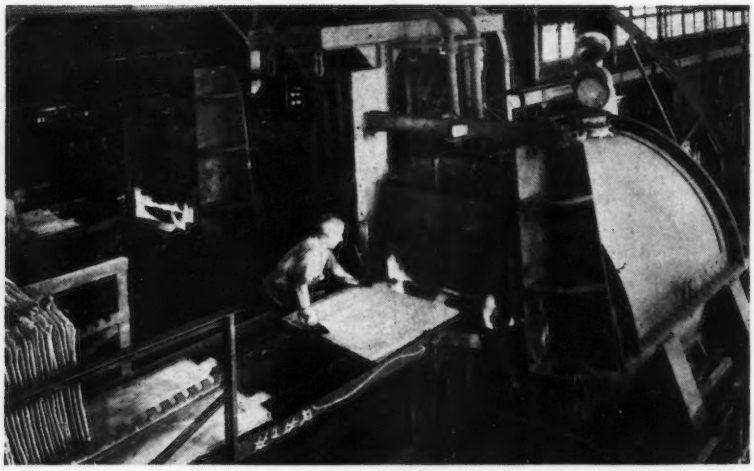


RECTIFYING-COLUMN zinc refining, developed by New Jersey Zinc Co., has proved to be a simple, practicable, efficient method of producing high-grade metal by redistillation.

REDUCTION AND REFINING *(Continued)*

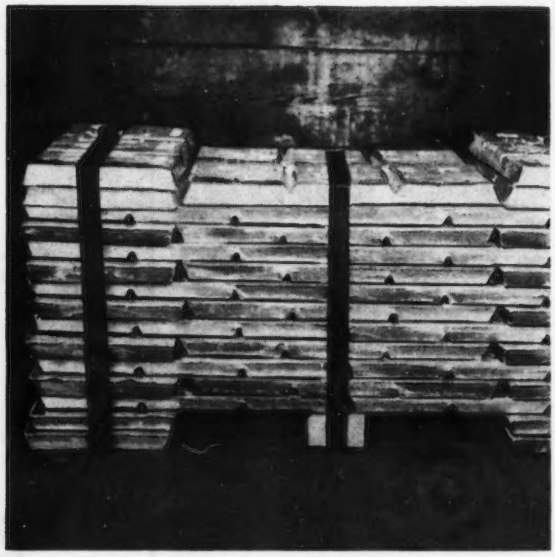


TEN-TON INGOTS, developed by American Smelting and Refining Co., for shipment between smelters and refineries, reduce handling costs and theft losses, and permit use of gondolas instead of box cars (Min. & Met., July, 1946, pp. 391-2). The ingots are cast with large screw eyes for handling, the eyes being backed out and the holes plugged when cars are loaded. At destination, ingots are handled with double tongs.



CONTINUOUS ELECTRIC MELTING, illustrated here in the production of oxygen-free copper in the 2250 kw. 7½ tons per hour furnace at Carteret, promises to outmode ordinary melting practices, not only because continuous processing is always cheaper, but also because the electric furnace permits control of furnace atmospheres, and produces less dross. We feel sure that continuous electric melting and casting will spread to the other nonferrous metals, being already practiced for aluminum and magnesium.

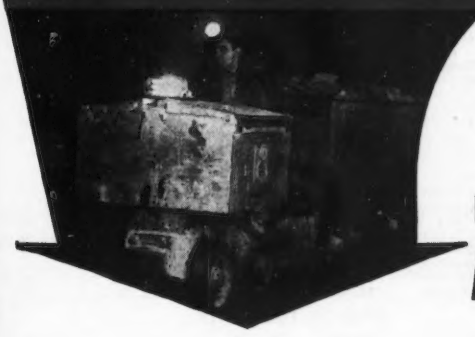
INTERLOCKING ZINC SLABS, and zinc pallets, developed at Anaconda's Great Falls reduction plant, plus use of steel-strap binding, make strong, easily handled, shipping bundles.



INGENIOUS METHOD of packing zinc slabs, practiced at Sullivan zinc plant, eliminates need for pallets in making strong bundles designed for handling with fork trucks.

SAFE

POWER



Avoid

LOST PRODUCTION TIME... USE

EXIDE-IRONCLAD POWER

There are no production slowdowns, no time out for adjustments, when electric haulage equipment is on the job... and the motive power is Exide-Ironclad power. Locomotives, trammers and shuttle cars move steadily along, straight through to the end of every shift.

The extra capacity and ruggedness of Exide-Ironclad Batteries are due to their special construction which differs from all other batteries. A major difference is in the positive plate. This consists of a series of slotted tubes which contain the active material. So fine are these slots that, while they permit easy access of the electrolyte, they prevent the active material from readily washing out. Not only does this add to life of plates... and battery... it also provides higher power ability and capacity, assuring dependable, day long performance with maximum safety and minimum maintenance.

Speed up production and reduce haulage costs. Choose Exide-Ironclad Batteries for your mine, quarry or tunnel operation. If you have a special battery problem, or wish more detailed information, send for booklet Form 1982.

ELECTRIC STORAGE BATTERY COMPANY, Philadelphia 32 • Exide Batteries of Canada, Limited, Toronto

MARKETS—Trends and Prices

IMPROVEMENT IN BUSINESS in non-ferrous metals that came into the market in September was carried forward at a slightly accelerated pace in October. Factors that contributed to the upward trend in activity included increased price stability, resulting in part from the absorption of material for the permanent stockpile, and a growing conviction by consumers that the proposed Marshall Plan of aid to Europe will exert added inflationary pressure on the country's economy. The move to reduce inventories, which was quite the thing practiced in the summer period, has definitely ended. Consumers purchased copper, lead, and zinc freely, holding to the view that prices will remain firm throughout the fourth quarter. However, few operators were inclined to take a long-term stand on the price situation.

A rise in freight rates that occurred on Oct. 14 was not absorbed by refiners of copper, with the result that our differential for arriving at the f.o.b. refinery basis has been increased to 0.300c. per pound. Effective on that day, domestic electrolytic copper, which continued at 21½c., Valley, was established at 21.200c., f.o.b. refinery.

Fabricators in this country consumed 108,413 tons of copper during September, against 96,484 tons in August and 87,167 tons in July. Consumption over the Oct.-Dec. period is expected to average more than 100,000 tons a month.

Foreign buying of copper was limited in volume by the difficulties surrounding the availability of exchange. However, inquiry from abroad improved and the price situation as the month ended appeared to be firmer.

Consumption of lead increased and the domestic market was firm at 15c., New York, and 14.80c., St. Louis. On export business, involving foreign-origin metal, producers held out for 14¼c., f.a.s. Gulf ports. The supply situation in lead was tight all along the line.

Zinc was featured by a steady call for both Prime Western and Special High Grade, and any uncertainty that existed earlier in the year as to prices has vanished.

Silver advanced on fairly active buying. Offerings increased as the price rose to 74½c., New York, with banks participating in the selling.

Antimony sold in the New York market in lots of 5 cases or more but less than a carload advanced on Oct. 14 to 36.03c. per pound, owing to higher freight charges.

Major Metals

U. S. DAILY AND AVERAGE PRICES

Oct. 1947	Electrolytic Copper: Domestic (a) Refinery	Electrolytic Copper: Export (b) Refinery	Straits Tin: New York	Lead: New York	Lead: St. Louis	Zinc: East St. Louis
1	21.225	21.425	80.000	15.000	14.800	10.500
2	21.225	21.375	80.000	15.000	14.800	10.500
3	21.225	21.425	80.000	15.000	14.800	10.500
4	No Market	21.425	80.000	15.000	14.800	10.500
6	21.225	21.400	80.000	15.000	14.800	10.500
7	21.225	21.425	80.000	15.000	14.800	10.500
8	21.225	21.425	80.000	15.000	14.800	10.500
9	21.225	21.300	80.000	15.000	14.800	10.500
10	21.225	21.425	80.000	15.000	14.800	10.500
11	No Market	21.425	80.000	15.000	14.800	10.500
13	Holiday	21.425	Holiday	Holiday	Holiday	Holiday
14	21.200	21.375	80.000	15.000	14.800	10.500
15	21.200	21.425	80.000	15.000	14.800	10.500
16	21.200	21.425	80.000	15.000	14.800	10.500
17	21.200	21.300	80.000	15.000	14.800	10.500
18	No Market	21.300	80.000	15.000	14.800	10.500
20	21.200	21.350	80.000	15.000	14.800	10.500
21	21.200	21.325	80.000	15.000	14.800	10.500
22	21.200	21.300	80.000	15.000	14.800	10.500
23	21.200	21.425	80.000	15.000	14.800	10.500
24	21.200	21.400	80.000	15.000	14.800	10.500
25	No Market	21.425	80.000	15.000	14.800	10.500
27	21.200	21.425	80.000	15.000	14.800	10.500
28	21.200	21.325	80.000	15.000	14.800	10.500
29	21.200	21.375	80.000	15.000	14.800	10.500
30	21.200	21.425	80.000	15.000	14.800	10.500
31	21.200	21.425	80.000	15.000	14.800	10.500
AVERAGES FOR MONTH						
Oct.	21.209	21.389	80.000	15.000	14.800	10.500
AVERAGES FOR WEEK						
Oct.						
1	21.225	21.408	80.000	15.000	14.800	10.500
8	21.225	21.413	80.000	15.000	14.800	10.500
15	21.213	21.396	80.000	15.000	14.800	10.500
22	21.200	21.333	80.000	15.000	14.800	10.500
29	21.200	21.396	80.000	15.000	14.800	10.500
CALENDAR WEEK AVERAGES						
Oct.						
4	21.225	21.408	80.000	15.000	14.800	10.500
11	21.225	21.400	80.000	15.000	14.800	10.500
18	21.200	21.375	80.000	15.000	14.800	10.500
25	21.200	21.371	80.000	15.000	14.800	10.500

Silver, Gold and Sterling

DAILY AND AVERAGE PRICES

Oct. 1947	Sterling Exchange "Checks"	Silver: (c) New York	Silver: London	Gold: London	Gold: (d) United States
1	402.750	71.375	43.250d.	172s. 3d.	$35.00
2	402.750	71.375	43.250d.	172s. 3d.	35.00
3	402.500	71.375	43.250d.	172s. 3d.	35.00
4	(e)	(e)	(e)	(e)	35.00
6	402.750	71.375	43.250d.	172s. 3d.	35.00
7	402.750	71.375	43.250d.	172s. 3d.	35.00
8	402.750	71.375	43.250d.	172s. 3d.	35.00
9	402.750	71.375	43.250d.	172s. 3d.	35.00
10	402.750	71.375	43.250d.	172s. 3d.	35.00
11	(e)	(e)	(e)	(e)	35.00
13	Holiday	Holiday	43.250d.	172s. 3d.	Holiday
14	402.750	71.375	43.250d.	172s. 3d.	35.00
15	402.750	71.375	43.250d.	172s. 3d.	35.00
16	402.750	71.375	43.250d.	172s. 3d.	35.00
17	402.750	71.375	43.250d.	172s. 3d.	35.00
18	(e)	(e)	(e)	(e)	35.00
20	402.750	71.375	43.250d.	172s. 3d.	35.00
21	402.750	71.375	43.250d.	172s. 3d.	35.00
22	402.750	71.375	43.250d.	172s. 3d.	35.00
23	403.000	71.375	43.250d.	172s. 3d.	35.00
24	402.750	71.375	43.250d.	172s. 3d.	35.00
25	(e)	(e)	(e)	(e)	35.00
27	402.750	71.375	43.375d.	172s. 3d.	35.00
28	402.750	71.500	43.375d.	172s. 3d.	35.00
29	402.750	71.750	43.500d.	172s. 3d.	35.00
30	402.500	73.250	44.000d.	172s. 3d.	35.00
31	402.500	74.500	44.875d.	172s. 3d.	35.00
AVERAGES FOR MONTH					
Oct.	402.727	71.625	43.375	—	$35.00
AVERAGES FOR WEEK					
Oct.					
1	402.650	71.375	—	—	—
8	402.700	71.375	—	—	—
15	402.750	71.375	—	—	—
22	402.750	71.375	—	—	—
29	402.800	71.475	—	—	—

Calendar week averages; New York Silver: Oct. 4th, 71.375; 11th, 71.375; 18th, 71.375; 25th, 71.375.

(e) No market (Saturday).

THE above quotations for major non-ferrous metals are our appraisal of the important United States markets, based on sales reported by producers and agencies. They are reduced to the basis of cash, New York or St. Louis. All prices, except gold and silver, are in cents per pound.

(a) Net prices at refineries on Atlantic seaboard. To arrive at the delivered New England basis add 0.300c. per pound, the average differential for delivery charges effective Oct. 14.

(b) Our export quotation for copper reflects prices obtaining in the open market and is based on sales in the foreign market reduced to the f.o.b. refinery equivalent, Atlantic seaboard. On f.a.s. transactions we deduct 0.075c. for lighterage, etc., to arrive at the f.o.b. refinery quotation.

Copper, lead and zinc quotations are based on sales for both prompt and future deliveries; tin quotations are for prompt delivery only.

Quotations for copper are for the ordinary forms of wirebars and ingot bars; cathodes are sold at a discount of 0.125c.

Quotations for zinc are for ordinary Prime Western brands. Zinc in New York commands a premium over the St. Louis basis equal to the freight differential. Contract prices for High Grade zinc delivered in the East and Middle West in nearly all instances command a premium of 1c. per pound over the current market for Prime Western but not less than 1c. over the *Engineering and Mining Journal's* average quotation for Prime Western for the previous month; the premium on Special High Grade in most instances is 1¼c.

Quotations for lead are for common lead.

(c) Determined by Handy & Harman on the basis of market prices for bar silver, in cents per troy ounce .999 fine, in amounts of 50,000 oz. or more, nearby delivery, New York. Price quoted is in cents and one-eighth cent fractions, and is usually about one-quarter cent below the market to allow for delivery, carrying, and marketing. In addition to foreign silver, the quotation also applies to domestic and Treasury silver if such silver enters into the market. The Treasury's purchase price of newly mined domestic silver **90.5c. per troy ounce 1000 fine, effective** July 1, 1946. London silver in pence per troy ounce, basis .999 fine.

(d) U. S. Treasury's gold price. Actual payment by the United States Treasury for gold in domestic and imported ore or concentrate is at 99.75 per cent of the price quoted by the Treasury, which is equal to $34.9125.

Taking the Distance Out of Your Steel Problems

Urgently needed by a Los Angeles engineering company, was a large shipment of stainless steel pipe in a special size. A call to the Ryerson plant in Los Angeles disclosed that the required pipe was not in Los Angeles stock, but *was* on hand in another city.

Ryerson Los Angeles immediately phoned Ryerson in Chicago. Could Chicago supply the desperately needed pipe? Chicago could—and did! The material was quickly trucked to a Chicago airport, flown to Los Angeles, and delivered at the customer's plant the following morning, less than 24 hours after the order was received.

That's how Ryerson—when the steel *is* available—can take the *distance* out of your steel problems. That's how the twelve closely cooperating plants of the Ryerson Steel-Service System often accomplish the seemingly impossible in an incredibly short time. And that's the sort of far-reaching service you can look for when you contact any Ryerson plant for any steel requirement.

Joseph T. Ryerson & Son, Inc. Plants at: New York, Boston, Philadelphia, Detroit, Cincinnati, Cleveland, Pittsburgh, Buffalo. Chicago, Milwaukee, St. Louis, Los Angeles.

PRINCIPAL PRODUCTS

Bars—hot and cold rolled	Mechanical Tubing	Tool Steel
alloy steel	Boiler Tubes and Fittings	Wire, Chain
reinforcing	Allegheny Stainless—	Bolts, Rivets
Structurals	sheets, plates, shapes,	Babbitt
Plates—	bars, tubing, etc.	Metal Working Tools
Inland 4-Way Floor Plate	Sheet and Strip Steel	& Machinery, etc.

RYERSON STEEL

MARKET — Trends and Prices

Miscellaneous Metals

(Monthly Averages)

Average prices of miscellaneous metals for September and October:

	Sept.	Oct.
Quicksilver, N. Y. flask	81.640	80.692
Antimony (a)	35.940	35.995
Antimony, bulk, Laredo	33.000	33.000
Antimony, in cases, Laredo	33.500	33.500
Antimony, Chinese (b)	.....	.....
Platinum, oz. troy	63.640	60.269
Cadmium (c)	175.000	175.000
Cadmium (d)	177.500	177.500
Cadmium (e)	180.000	180.000
Aluminum ingot	15.000	15.000
Magnesium	20.500	20.500

(a) New York, packed in cases, in lots of 5 tons or more but less than a carload. (b) Nominal. (c) Producer's price for commercial sticks. (d) Average producers' and platers' quotations. (e) Special shapes sold to platers.

E. & M. J. Weighted Index of Non-Ferrous Metal Prices

100 is composite for 1922-3-4. (Copper, Lead, Zinc, Tin, Silver, Nickel, Aluminum)

1937	90.86	1942	86.80
1938	73.67	1943	88.74
1939	77.71	1944	88.74
1940	79.22	1945	90.86
1941	83.49	1946	110.057

	1945	1946	1947
January	88.74	96.42	140.88
February	88.74	96.42	140.42
March	88.74	96.42	150.71
April	88.74	96.42	153.14
May	88.74	96.42	154.03
June	88.74	107.16	150.05
July	88.74	117.11	148.73
August	88.74	113.32	149.35
September	91.16	113.32	150.80
October	96.40	114.25	151.05
November	96.42	131.23	.....
December	96.42	142.19	.....

Official London Prices

Since Dec. 18, 1939, the British Ministry of Supply has named maximum delivered prices for the major non-ferrous metals. Prevailing delivered prices for consumers in the United Kingdom follow:

	Per Long Ton £	s.	d.
COPPER:			
Electrolytic, high conductivity	132	0	0
Fire refined, high conductivity	132	0	0
Fire refined, high grade	131	10	0
Fire refined, min. 99.2 percent	131	0	0
Fire refined, min. 99.7	130	10	0
Hot rolled black wire rods	138	0	0
LEAD:			
Soft, foreign, duty paid	90	0	0
Soft, Empire	90	0	0
English refined	91	10	0
ZINC:			
Foreign (G.o.b.), duty paid	70	0	0
Domestic (G.o.b.)	70	0	0
Prime Western and debased	70	0	0
Refined and electrolytic	70	15	0
Minimum 99.99 percent	72	5	0
TIN:			
Ingot, 99 percent	437	0	0

Miscellaneous Metals, Ores, Minerals

Quotations cover wholesale lots, prompt shipment, f.o.b. New York, unless otherwise stated

MISCELLANEOUS METALS

(October 31, 1947)

Aluminum, ingot, 99 plus percent, lb.	15c.
Antimony, spot, lb., 5 tons and up but less than carload, in cases	36.03c.
Bismuth, ton lots, lb.	$2.00
Cadmium, commercial sticks, lb.	$1.75
Calcium, lb. ton lots, 98 percent, cast	$1.85
Chromium, 97 percent grade, lb.	89c.
Cobalt, 97 to 99 percent, per lb.	$1.65
Indium, troy oz.	$2.25
Nickel, electrolytic cathodes, lb.	35c.
Magnesium, 99.8 percent, carloads, lb.	20½c.
Palladium, troy oz.	$24.00
Platinum (Official quotation wholesale lots) troy oz.	$62.00
Quicksilver, flask of 76 lb., 25 flasks or more	$80.00
Selenium, 99.5 percent, lb.	$2.00
Silicon, minimum 97 percent, spot, carloads, lb.	14.75c.
Tellurium, lb.	$1.75 nom.
Thallium, 100 lb. or more, lb.	$20.00
Titanium, 96 to 98 percent, lb.	$8.00

METALLIC ORES

Beryllium Ore, 8 to 12% BeO, f.o.b. mine, per unit	$14.00@$16.00
Chrome Ore, per long ton, f.o.b. cars Atl. ports, dry 48% Cr_2O_3, 2.8 to 1 ratio (Prices nominal)	$37.00@$38.00
48% Cr_2O_3, 3 to 1 ratio	$39.00@$40.00
Iron Ore, Lake Superior, Lower Lake ports, long ton:	
Old Range bessemer	$5.95
Mesabi bessemer	$5.70
Old Range non-bessemer	$5.80
Mesabi, non-bessemer	$5.55
Lead (Galena) 80 percent, Joplin, Mo., ton	$195.65
Manganese Ore — Per long ton unit of Mn, basis 48 percent manganese, subject to premiums and penalties, f.o.b. cars Atlantic and Gulf ports, duty paid, 62@66c.	
Molybdenum Ore, 90%, per lb. of MoS_2 f.o.b. mines	45c.
Tungsten Ore, per unit of WO_3:	
Foreign, 60 percent, duty paid	$29@$30
Domestic, scheelite, 60 percent and upward	$30
Vanadium Ore, per lb. of contained V_2O_5 f.o.b. mines	27½c.
Zinc Ore, Prime, 60 percent concentrate, Joplin, Mo., per ton	$70.35

METALLIC COMPOUNDS

Arsenious Oxide (arsenic trioxide) lb., in bbl., carload lots	6c.
Cobalt Oxide, 70 to 71 percent, lb.	$1.27½
Copper Sulphate, 100 lb.	$7.60

ALLOYS

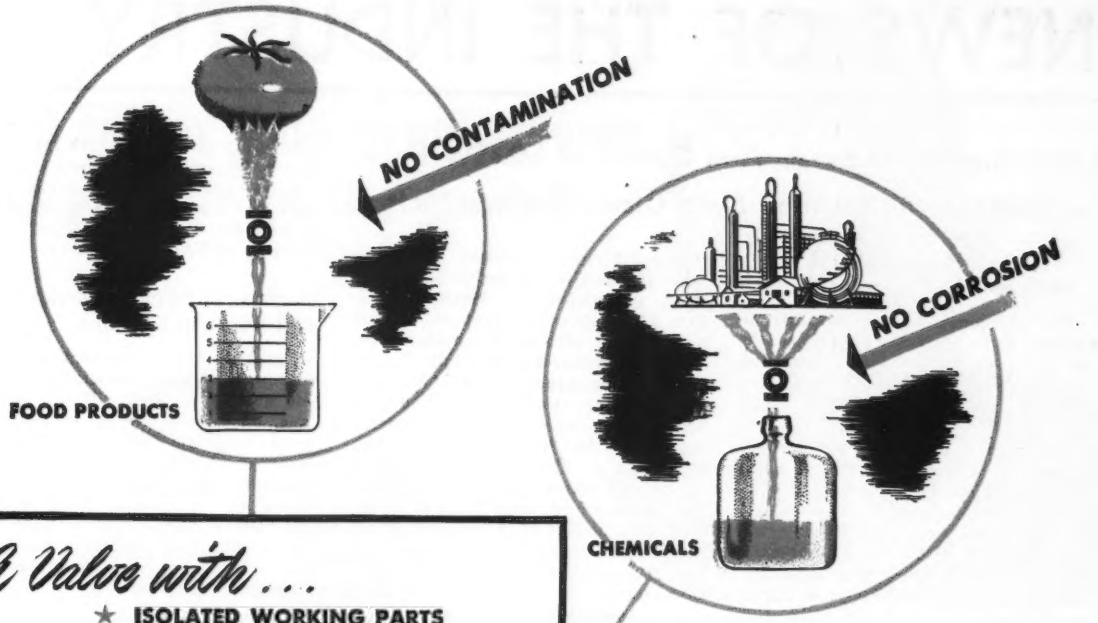
Beryllium Copper, 2.5 to 3 percent Be, per lb. of contained Be	$14.75
Ferrochrome, 65 to 70 percent, per lb. of Cr contained	15.60c.
Ferromanganese, 78 to 82 percent, gross ton	$150.00
Ferromolybdenum, 55 to 65 percent Mo, lb. of Mo contained	95c.
Ferrosilicon, 50 percent, per lb. of contained Si	7.80c.
Ferrotungsten, 75 to 80 percent, lb. of W contained	$2.50
Ferrovanadium, per lb. of V delivered	$2.90
Silicomanganese, 1½ percent C, per lb., contracts	7.40c.

NON-METALLIC MINERALS

Asbestos, f.o.b. Canada (Quebec) mines (U.S funds), ton:	
Crude No. 1	$800
Crude No. 2	$302@$410
Spinning fibers	$170@$230
Paper stock	$43@$65
Shorts	$20@$38
Vermont, f.o.b. Hyde Park:	
Shingle stock	$82.50@$91.50
Paper stock	$58.00@$65.00
Waste	$43.00
Refuse or shorts	$20.50@$38.50
Barytes, f.o.b. mines:	
Georgia, crude, per long ton	$11.50@$12.00
Missouri, 93 to 94 percent $BaSO_4$, per short ton	$9.00@$9.50
Bauxite, long ton:	
Domestic, crude, 50 to 52 percent (not dried)	$4.00@$5.00
Domestic, chemical, 55 to 58 percent	$7.50@$8.50
Domestic, abrasive, 80 to 84 percent	$16.50
China Clay, f.o.b. mines, ton:	
South Carolina and Georgia, No. 1, airfloated, bulk	$6.75@$8.00
Maryland, ball, bulk	$7.00@$9.00
Feldspar, bulk ton:	
Potash feldspar, 200 mesh	$17.00
Glass spar, white, 20 mesh	$11.75
Fluorspar, f.o.b. mines, bulk, Kentucky and Illinois 70 percent, all rail movement, ton	$34.50
Acid 98 and 1 percent, bulk, ton	$38.50
Fuller's earth, f.o.b. Georgia or Florida, ton	$7.00@$14.00
Magnesite, per ton dead-burned, f.o.b. Washington	$24.00
Mica — Domestic f.o.b. mines. Punch, 6 to 15c. per lb. according to size and quality. Sheet, clear, 1½x2 inch, 60 to 65c.; 2x2 inch, 95c. to $1; 2x3 inch, $1.35; 3x3 inch, $1.80; 3x4 inch, $2.25; 3x5 inch $3; 4x6 inch, $4; 6x8 inch, $6. Wet ground, very fine, $90 per ton. Bulk sales, dry ground, $32.50 per ton. Scrap, 28 and up, depending on quality.	
Ocher, Georgia, ton, in sacks	$24.00
Pyrites, Spanish, per long ton unit of S, c.i.f. Atlantic ports	14c., nom.
Silica, in bags, 325 mesh, ton	$20.00@$40.00
Sulphur, Texas, mines, long ton	$16.00@$18.00
Talc, f.o.b. works, ton:	
New York, air-floated, 325 mesh	$18.50@$20.00
Vermont, extra white, 200 mesh	$12.50
Tripoli, Missouri, ton:	
40 mesh, cream colored	$14.50

IRON AND STEEL

Pig Iron, Valley furnaces, gross ton: Basic	$36.00
Steel, base price, Pittsburgh Billets, gross ton	$45.75
Structural shapes, 100 lb.	$2.80



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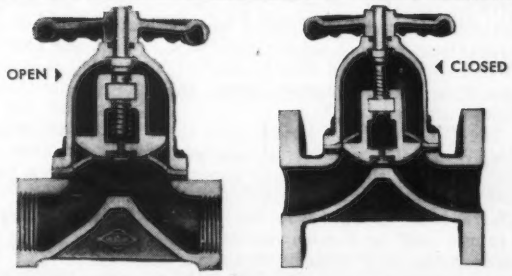

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NEWS OF THE INDUSTRY

Left-Wing Forces Retain Firm Control of MMSW Union — Clark-Travis-Robinson Slate Claims Election Victory

JOSEPH GAMBATESE
McGraw-Hill Washington Office

The CIO convention, held in Boston, October 13 to 18 inclusive, kept hands off the split in the Mine, Mill and Smelter Workers Union as predicted here last month (*E.&M.J.*, Oct., 1947, page 101.)

This means, then, that the seceded right-wing locals, comprising some 15,000 members, chiefly in the Connecticut "Brass Valley," will go into the Industrial Union of Marine and Ship Building Workers, a right-wing CIO union, with which they have tentatively been affiliated as the Provisional Metal Council. Officially, this will take place at the IUMSWA convention, Feb. 9, in Cleveland.

It also means that the results of the Oct. 6 special referendum on new officers and four constitutional amendments conducted among MMSW members will not be disturbed. The left-wing forces are now more in control of this union of approximately 109,000 members than ever before.

At press time, Oct. 18, the Clark-Travis-Robinson slate was claiming a victory in all offices. Their slate included one former ally of the secessionists, Wesley Madill of Garfield, Utah, candidate for Western vice president. Madill was left with only minor opposition when the left-wing leadership prevailed on Chet Smothermon, of Carlsbad, N. M., to drop out of the race.

President Maurice Travis, candidate for secretary-treasurer, urged support for Madill because he represents a "substantial section of the thinking of this union." This "section," Travis said, is entitled to representation in the union leadership. Evidently Madill will then be the only executive board member from the right-wing "section."

The CIO executive board, with the MMSW member not voting, approved the report of the three-man committee which investigated this union's affairs last spring. But the report was not sent to the convention floor because the only remedy would have been expulsion from CIO. This nobody seemed to want. MMSW had already rejected the recommendation at its St. Paul convention in August, although it complied in part by the withdrawal of Travis from the presidency and the subsequent referendum for new officers.

John Clark, of Great Falls, Mont., who will assume the presidency when the new board meets in January, has replaced former president Reid Robinson in the CIO executive board. He stood unopposed for MMSW president after his only opponent, George Knott, New Mexico organizer, withdrew in the interest of "unity."

It was apparent at the CIO convention that most affiliated unions will qualify under the Taft-Hartley law to use the National Labor Relations Board. This raises a problem for unions whose officials might risk imprisonment if they falsely swear that they do not hold communist beliefs. These unions will be easy targets for raiding by AFL or other CIO unions.

An associate of Travis and Robinson believes MMSW will be forced to get under the NLRB tent eventually in order to protect its position in the labor movement.

Labor Problems Discussed At Saranac Symposium

Addressing the Sixth Saranac Symposium at Saranac Lake, N. Y., October 3, Andrew Fletcher, president of St. Joseph Lead Co., asserted that careful attention to safety pays financial rewards over and above the humanitarian gains. He pointed out, however, that certain deficiencies in the compensation laws force employers to adopt undesirably stern practices in self defense; also that competent medical diagnoses should take account of case histories and working conditions. Mr. Fletcher took the position that sick leave with pay is an undesirable feature in personnel relations because it is compensation for work not done and conducive to excessive absenteeism and thriftlessness. He cited figures indicating that in the company's southeastern Missouri mines, absences because of sickness and for personal reasons rose from 2.16 in 1941 to 5.49 in 1945 and 4.07 in 1946, expressing shifts not worked as a percentage of total shifts.

New Jersey Zinc Company Forms Two Subsidiaries

The New Jersey Zinc Co. has announced the formation of two new subsidiaries, The New Jersey Zinc Exploration Co. and Valley Mining Co. Both are wholly owned and were formed primarily for prospecting and exploration. Operations of the exploration company will include all types of mining ventures, and provision is made for mining, milling, smelting, processing, manufacturing and selling of any of these materials. Valley Mining Co., formed for the purpose of prospecting in various sections of Canada, was incorporated in Quebec, and is also registered in the Province of British Columbia.

Northwest Mining Group Will Meet in Spokane

The 53rd annual convention of the Northwest Mining Association will be held at the Davenport Hotel, in Spokane, on Dec. 5 and 6, according to the Association's secretary, Roger O. Oscarson. Reconversion developments in metal mining will be a major topic during the meetings. Members will also discuss premium price plans and the extent of government participation with private industry in development and exploration works.

Artificial Crystals to Replace Natural Quartz

Artificial crystals are expected to replace as much as 90% of the natural quartz used in long-distance telephone systems in a few years, according to the Bell Telephone Laboratories. Some New York to St. Louis circuits are already using them.

Western Electric Co. has constructed a plant at Allentown, Pa., to produce the new crystals for use in long-distance telephone circuits. The new crystals differ markedly from quartz in chemical composition but are piezo-electric in character in that they can convert mechanical energy to electrical, or the reverse.

A small slice, or plate, of such a crystal will vibrate with unvarying frequency when electric current is applied to it. Telephone engineers employ this characteristic of quartz —and now of ethylene diamine tartrate, known as EDT — in sending many telephone conversations over the same wires at one time but at different frequencies.

The new crystal is the direct result of research on growing artificial crystals. In commercial production, the artificially grown crystal weighs about a pound, is about six inches in length and two by three inches in cross-section. Full-grown crystals are cut into plates, roughly one-eighth of an inch thick, an inch-and-a-half long, and one-half inch wide. The plates are coated with a film of gold hardly one-millionth of an inch thick, which serves as an electrical connection. They are then mounted in a glass envelope to form a unit.

The first tiny seeds of crystal from which subsequent crops were harvested were only one-third of an inch across. They were obtained by evaporating a saturated solution.

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PERSONAL NEWS

H. J. Rahilly, general superintendent of mines for the Anaconda Copper Mining Co. since September 1943, has been named manager of mines, succeeding **James J. Carrigan,** who

H. J. RAHILLY

has retired because of ill health. **A. C. Bigley,** who has been assistant superintendent of mines since 1940, will succeed Mr. Rahilly. **Hale Strock,** foreman of the Leonard mine since 1939, has been appointed to Mr. Bigley's former position. An outstanding operating official in the Butte mines for many years, Mr. Carrigan played a prominent part in the development of the district. Officials of the Anaconda company have expressed the deepest regret that poor health has forced his retirement after long and useful service. Mr. Rahilly, who joined the company in 1917, is a graduate of the School of Mines of the University of Minnesota. He has had wide mining experience in the Rocky Mountain area, Mexico and South America. At one time or another, he has had charge of each of Anaconda's groups of mines on the Butte hill. Mr. Bigley, a graduate of the Colorado School of Mines, came to Butte in 1913 to begin his career. He was appointed assistant general superintendent in 1940. Mr. Strock, also a graduate of Colorado School of Mines, joined the company in 1922. He left Butte in 1926 to work at Cripple Creek, Colo., and returned in 1928 to become a sampler at the Tramway mine. He became foreman of the Leonard mine in November 1939.

CORRECTION

Jack Spalding, of John Taylor & Sons, London, and author of the article entitled "Deep Mining Problems in the Kolar Gold Field," which was published in the August, 1947 *E.&M.J.*, calls our attention to a misprint in the article. The depth of the primary shaft of the Champion Reef mine, which is given in the article as 5,560 ft., is really 6,560 ft., 1,000 ft. deeper.

S. Livingston Mather, 65, has retired as vice president in charge of operations of the Cleveland-Cliffs Iron Co., a position he has held since 1926. The oldest son of the late Samuel Mather, a partner in Pickands, Mather & Co., he followed into retirement his uncle, William G. Mather, who gave up his position as chairman and member of the board of directors of Cleveland-Cliffs Iron Co. and Cliffs Corp. on April 9. S. L. Mather joined the company in 1905, following his graduation from Yale. He was formerly vice president of the Cliffs Corporation, which merged with Cleveland-Cliffs last July. Mr. Mather will have an office in the Union Bank of Commerce Bldg., Cleveland, where he will devote his time to the corporations in which he holds a directorship. These include Youngstown Sheet & Tube Co., Bessemer Limestone & Cement Co., Cleveland City Forge Co., and Pettibone-Milliken Corp.

C. J. Stakel, formerly manager of the mining department of Cleveland-Cliffs Iron Co., has been promoted to general manager of mines. **Fayette Brown** will be assistant general manager. **C. W. Allen,** formerly assistant manager, is now manager of the Michigan mines, and **W. A. Sterling** has been promoted from assistant manager for Minnesota mines to manager of that division. These changes became effective Oct. 1.

JAMES J. CARRIGAN

E. W. Hunt, formerly mine manager for Roan Antelope Copper Mines, Ltd., at Luanshya, Northern Rhodesia, is now assistant mine superintendent and chief engineer for Hudson Bay Mining & Smelting Co., Flin Flon, Manitoba.

Roman Chelminski, for many years associated with the Dorr Company and more recently with the Process Division of General American Transportation Corp., has resigned the latter position to join Knowles Associates, a New York engineering and consulting organization, as general partner. Mr. Chelminski expects to expand the firm's work in the fields of ore beneficiation, metallurgical concentration and machine design.

OBITUARIES

Harold S. Martin died September 24 at Bartow, Fla. He was recently president of Southern Phosphate Corporation at Bartow and previously had been general manager in charge of the potash operations of International Minerals & Chemical Corporation, in the Carlsbad area, New Mexico.

Wayverne Walter Brooke-Howard, 49, manager of the Selukwe, Southern Rhodesia, mines of Rhodesia Chrome Mines, Ltd., was killed in an automobile accident near Selukwe on August 10.

Henry A. Robinson, 66, retired chief engineer of the Virginia and Eveleth district, Oliver Iron Mining Co., died in Virginia, Minn., Sept. 11. He had been with the company from 1908 to his retirement in December, 1946.

Glynguard R. Burge, 47, died August 31 at Wellesley Hospital, Toronto. Mr. Burge was president of Giant Yellowknife Gold Mines, and was one of the pioneers in the use of aircraft in connection with mining development. He was born in Wales, and was a graduate of the London School of Economics.

LETTERS

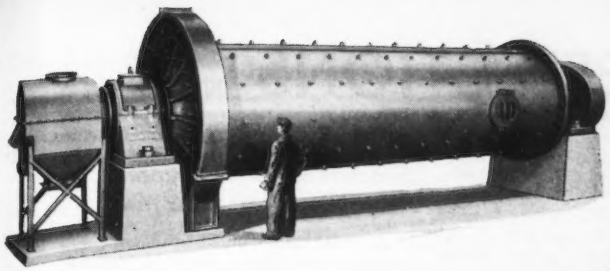
Reserves of Metaline District

The Editor:

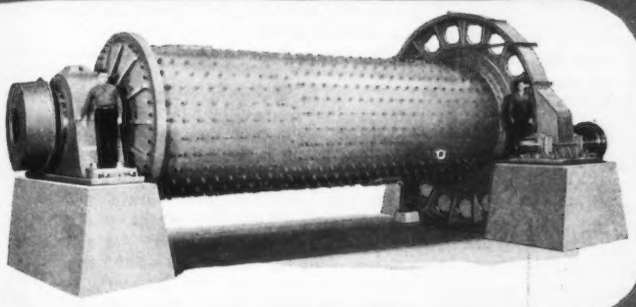
My attention has been called to a statement on page 135 of the August issue of *Engineering and Mining Journal* to the effect that "the U. S. Bureau of Mines and Geological Survey estimate that about six billion dollars worth of lead-zinc ore reserves lie in the Metaline mining district."

Your source of information on this estimate is not clear to me. While the Survey considers the Metaline district to be one of our major zinc-lead districts, it doubts that there is evidence to support the six billion dollar figure, and wishes to disclaim any responsibility for such an estimate.

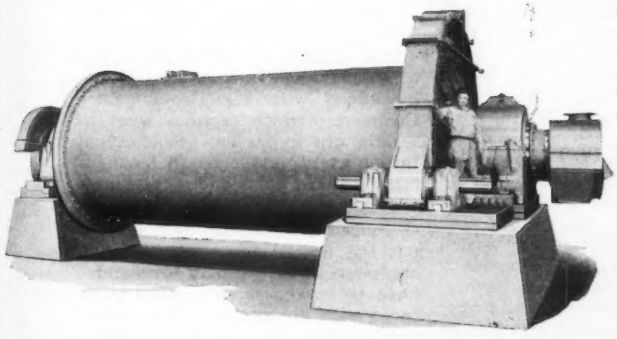
H. S. LADD
Acting Chief Geologist
U. S. Geological Survey
Washington, D. C.



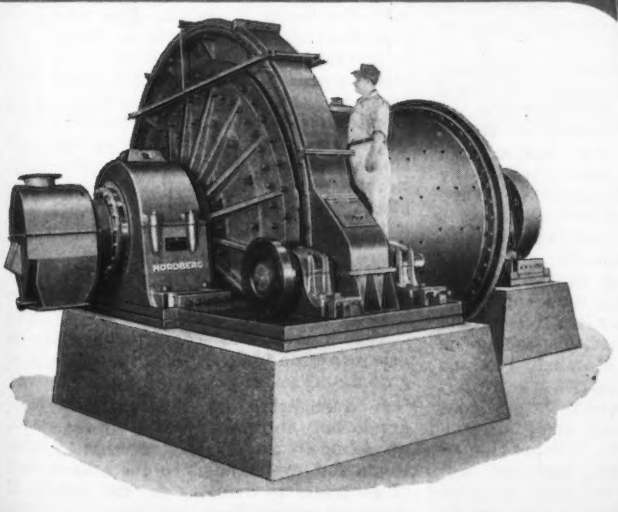
5' x 22' Tube Mill.



9'6" x 32' Two Compartment Mill.



9'6" x 24' Pebble Mill.



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WASHINGTON REFLECTIONS

McGraw-Hill Washington News Bureau

Communist Affidavits Not Required at Top Level

A policy decision important to the country as a whole as well as to management and organized labor has been made by the National Labor Relations Board.

By a vote of 4 to 1, NLRB has held that Section (9h) of the Taft-Hartley law requires only that officers of a local union and the international union with which it is affiliated must file non-Communist affidavits before NLRB (1) may conduct representation elections or compulsory union membership polls involving that union, or (2) may investigate unfair labor practice charges filed by the union.

Immediate effect of NLRB's decision is to nullify Lewis's veto in the AFL executive council which had blocked that body from complying with the Denham ruling and thereby denying any AFL affiliate access to NLRB assistance. The AFL's Metal Trades Dept. and Building Trades Dept., representing more than half the AFL membership, had gone on record in favor of complying with the law and were prepared to force action at the AFL convention now in session. Most AFL unions now may, and will, qualify themselves under the law. The United Mine Workers will be the only large holdout. AFL unions can grab the edge over non-qualified CIO rivals.

The problem is not as simple in the CIO, where a dozen unions are said to have Communist-minded leadership. CIO General Counsel Lee Pressman, friend of the Communists, has advised CIO unions that they can only hurt themselves by using NLRB. CIO vice presidents, however, declined to take a stand at a meeting in Pittsburgh last month, preferring to let the issue ride until next week's CIO convention. Some CIO unions—textile, wood, hosiery and utility workers—have indicated they will file non-Communist affidavits and avail themselves of NLRB help. The left-wing unions—electrical, maritime, meat, mine and smelter, automobile, food and others—as well as Phil Murray's own right-wing steel workers, have opposed compliance.

There are two other aspects of the NLRB decision which should be mentioned:

1. It relieves the AFL and CIO of the necessity of filing a financial statement with the Labor Dept. This is important only with respect to the CIO, which has never publicized its financial condition.

2. As they are now constituted, local unions affiliated *directly* with the AFL and CIO probably cannot use NLRB unless the AFL and CIO officers file the non-Communist affidavits and qualify in other respects. There are 1,390 such "federal labor unions" in the AFL with 244,513 members. The CIO has 400 "local industrial unions" with about 70,000 members.

Marshall Plan Will Require Restoration of Controls

When Congress decides how much aid to give Europe under the Marshall Plan, it will have to decide in the same breath how much regimentation must be imposed on the U.S. businessman.

The $20,000,000,000 plus tally of U.S. goods that the Marshall Plan countries have requested adds up to resumption of Governmental controls over distribution, use, and export of a wide range of commodities.

This means a return to materials allocation, using some of the techniques of the wartime CMP (Controlled Materials Plan). CMP took three years to perfect. No one in Government can see any but a wartime type of control that will hold the economy together under the strain of the Marshall Plan.

Under a CMP-type plan, the heart of the control framework would be a requirements screening board, cutting the U.S. production pie.

Control machinery to make possible the heavy volume of exports, and at the same time give the customers at home and the rest of the world enough to keep going, would be broken down into three categories. They would consist of export licensing, allocation of scarce materials, and control over use of scarce materials.

Who would do the controlling? At present the Department of Commerce, through its Offices of Materials Distribution and International Trade, is administering the tag ends of wartime controls.

The old-line Government agencies argue that present machinery would be adequate for administration of further controls. Others in Washington—politicians and businessmen—shy away from administration by the permanent bureaucracies. They advocate, instead, a new, separate—and temporary—central agency.

All concerned, however, are united in wanting unified control, rather than a split control, with confusion.

Domestic economy controls would be many and varied, depending on the scope of the Marshall Plan as sanctioned by Congress. However, those already apparent include continuation of present reins of tin, antimony, and fibers; reimposition of use controls on steel, lead and cadmium; and "wartime" type priorities for finished goods and raw materials.

Stockpiling Will Compete With Consumer Industries

A "blackout" on information concerning purchases for the military stockpile has been imposed by the Army-Navy Munitions Board and the Treasury Bureau of Federal Supply in a new "tough" policy adopted to prevent "speculators" from jacking up market prices.

Hampered by a Congressional mandate that military stockpiling take a back seat in procurement of strategic and critical materials—deferring procurement on some 60-odd commodities until industry has its fill—the munitions board for the past three years has been unable to obtain even minimum requirements of many materials. There has also been the conviction among the stockpilers that prices are too high and it would be better to wait until the markets soften somewhat.

Now, however, the military sees that it will have to take positive steps in order to stay on schedule in its security program and has started into buying competition with industry.

The board's determination to build a minimum stockpile has precipitated a quarrel with the Department of Commerce, which certifies what materials are in civilian short supply, thus preventing the board from buying in these commodity categories.

Commerce, pressured to ease off its shortage certifications, said no. This put the board in a spot. Although empowered to go over Commerce's head in purchases, the board is now faced with another "civilian vs. military" fight such as paced original legislation for the military stockpile. This time the fight will be at cabinet level.

In Public Law 520, the Stockpiling Act, the board is mandated to procure stockpile materials "in so far as is practicable" from excess of industrial need. In order to get away from Congress' mandate to refrain from competing with private industry for scarce materials, the board has singled out the "in so far as is practicable" phrase as its authority to go ahead with efforts to obtain at least a minimum stockpile. This is what the stockpilers are waving at Department of Commerce objections over interference with an already deficient supply of material.

The board's old conviction that prices are too high also has been forgotten.

In announcing the "blackout" on purchasing information, the Bureau of Federal Supply stated that it would not even announce the award of contracts to industry for the purchase of copper, lead, and zinc.

Krug Says Resources Can Support Marshall Plan

The "have-not" argument concerning American mineral resources has come to life again, this time in the Interior Department "Krug report" to President Truman on the impact of the Marshall Plan on the domestic economy.

The report states that, if current high levels of business activity continue, the domestic and export demands will require "maximum" domestic production and "substantial" imports of most of the non-ferrous metals.

"Foreign resources are available for most metals needed in both a high level domestic economy and a foreign aid program. The quantities of antimony, cadmium, and lead in sight for the next few years are short of world requirements, but they are sufficient for essential needs. Tin is exceedingly scarce, but ample supplies are expected by 1950," the report continues.

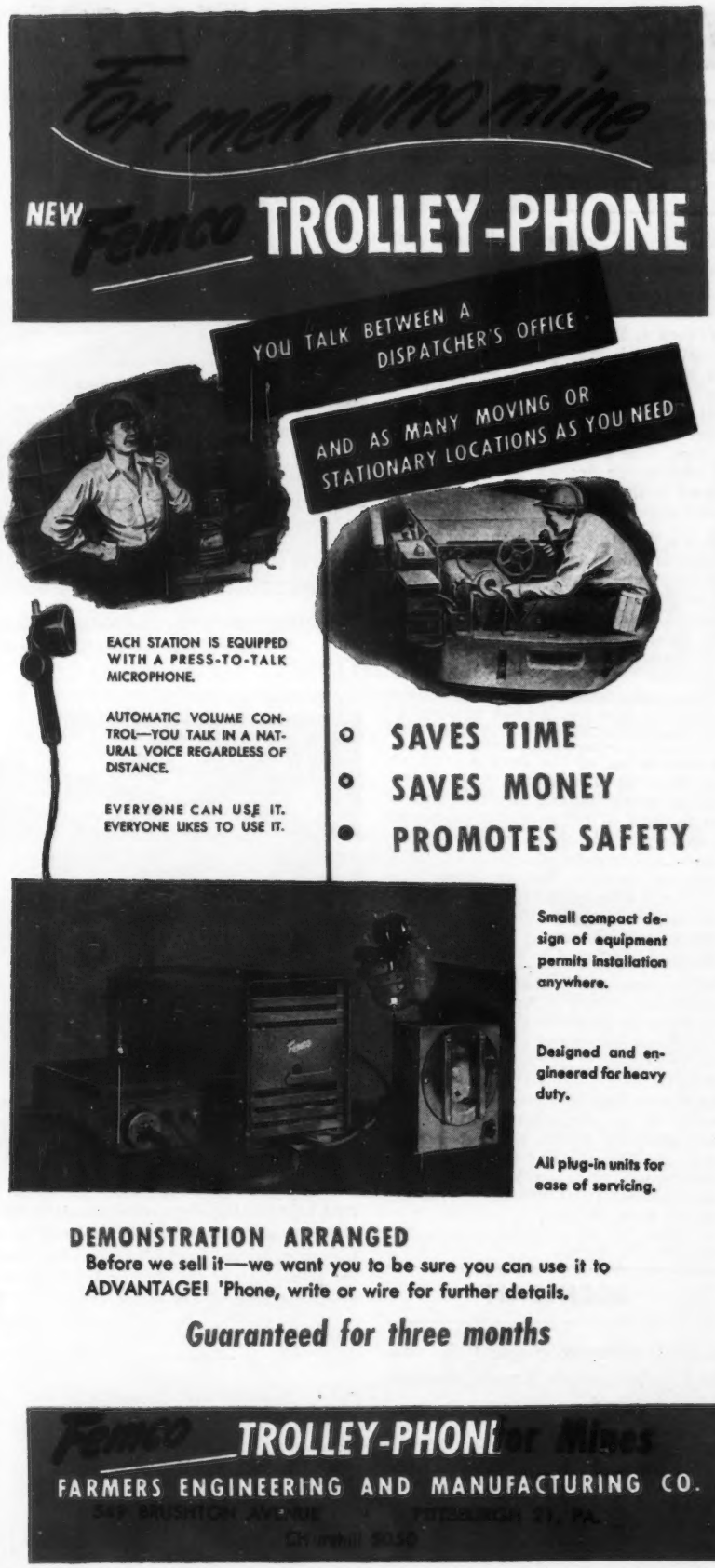
"Foreign resources, likewise, must be utilized to meet current domestic needs as well as expanded exports of products requiring aluminum, chromium, copper, manganese, mercury, nickel, tungsten, and zinc. Under foreseeable conditions these resources will continue to be available in adequate quantities. Additional needs for magnesium, molybdenum, and vanadium probably would be obtained from sources within the U. S. but the quantities likely to be shipped abroad are small compared with total domestic consumption and reserves. Consequently," the report states, "a sizable increase in exports of goods from the U. S. for the rehabilitation program would not cause significant depletion of domestic metal resources."

The report advocates consideration of "the advisability of future shipments of foreign minerals to the U. S. in partial repayment of aid extended in the foreign rehabilitation program" because the Marshall Plan would delay stockpiling.

Rail Rate Demands May Be Pushed Even Higher

Preparatory to digging into the railroad's petition for a 27% increase in freight rates, the Interstate Commerce Commission, following its recent hearings, has granted an "emergency" 10% hike in rates.

Although the roads started their case on July 3 with a request for a 17% hike, then amended it Sept. 5 by adding another 10% to the bill, it is evident that there is more to come. The Sept. 5 addition was necessitated, according to the railroad, by a wage hike of 15½c per hr. to the non-operating brotherhoods. They commented at that time that "any more increases in labor rates or materials costs" would be added to the petition.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REGIONAL NEWS

IRON COUNTRY

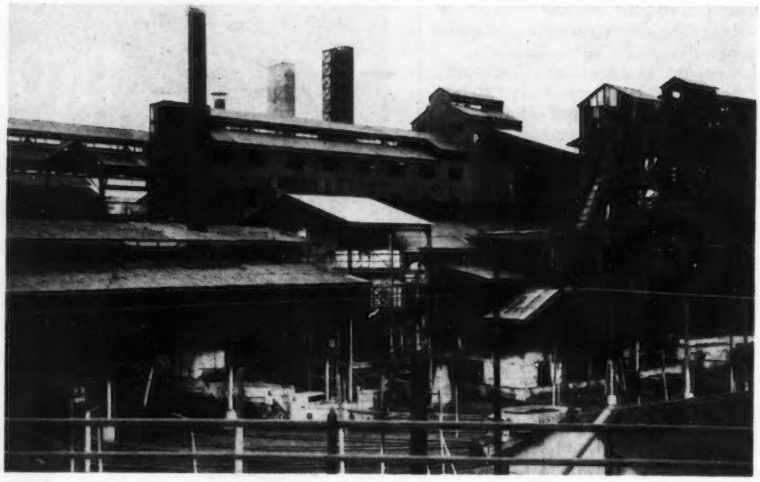
New J. & L. research laboratory at Ishpeming ready for work on pilot-plant scale

★Jones & Laughlin Ore Co. has contracted with Walsh Construction Co., of New York, to sink a 600-ft. shaft at their Vikers property, which is just east of the Sunday Lake mine near Wakefield, Mich., on the Gogebic range. The shaft will be used to mine a high-grade deposit proved by diamond drilling. H. S. Peterson is district superintendent.

★As a result of the shortage of water experienced last winter for making hydro-electric power, Cleveland-Cliffs Iron Co., through its Cliffs Power and Light Co. affiliate, is installing a stand-by diesel plant at Ishpeming. This will have five 1700-hp. diesel engines connected to 1000-kw. generators. These units were purchased from the Navy and saw war service in destroyer escorts.

★Dewatering of the Bengal mine on the Menominee range for M. A. Hanna Co. is proceeding rapidly and should be finished in 60 days. A deep-well turbine pump installed in the shaft by the Lane-Northwest Co., of Milwaukee, extends 540 ft. down the shaft and pumps 2000 g.p.m. 24 hours per day. S. E. Quayle, manager of mines in Michigan, is in charge for the M. A. Hanna Co.

★The new ore research laboratory erected southeast of Negaunee, Mich., by Jones & Laughlin Ore Co. was recently completed and opened for public inspection. Some equipment is still to be delivered but sufficient machinery has been installed to start work on a pilot-plant scale. The laboratory is under the supervision of F. X. Tartaron and is a division of the company's research and development laboratory at Pittsburgh, headed by Dr. H. K. Work.



A GENERAL VIEW of the blast furnace and sintering plant at American Smelting & Refining Co.'s El Paso smelter. (Courtesy of U. S. Bureau of Reclamation.)

THIS MURAL, depicting certain aspects of the Dorr Company's history and operations, now graces the east wall of the pilot plant addition to the Westport Mill, the company's research and testing laboratory at Westport, Conn. Growing out of an idea of Mr. Dorr's, the mural was conceived and executed by Eric Stocklassa, Swedish artist. The artist's intent was to reflect the personal and unique character of the Dorr Company in its relationship to the progress of world-wide industry.

MICHIGAN

Quincy reclamation plant is now fully paid for. Isle Royale declares 50-c. dividend

★Calumet & Hecla's Lake Linden reclamation plant, in operation since 1915, will close for the winter Nov. 9. It will be reopened next spring for the final clean-up of the sand bank. This will take four months to complete. Repairs and dismantling will be done during the shut-down.

★Calumet conglomerate sands remaining near the Calumet dam, in Calumet, are being transported to the Lake Linden plant for treatment there. At the present price of copper, the work will be profitable, although the quantity involved is small.

★Equipment is being installed at C. & H.'s Tamarack reclamation plant for producing a chemically-pure cupric oxide suitable for direct usage in industrial processes where mixed copper oxide is less desirable or unsuited, as in rayon manufacture, pe-

troleum refining, or as a coloring agent in glasses and glazes. Mixed oxide will be used as a raw material. The plant will be in operation this month.

★Calumet & Hecla recently sank a 22-ft. vertical shaft to the ledge for ventilation and safety purposes 700 ft. north of No. 1 Iroquois. A raise now being driven from the stope through the vein on the sixth level, Iroquois, will connect with it. Drifting has been started north and south on 22d level Iroquois.

★The 44th level, No. 2 Centennial mine of Calumet & Hecla, has been connected with the 39th level of No. 1 Kearsarge. This was necessary to start stoping in No. 1 Kearsarge area; also to be able to use No. 1 shaft in lowering the water level in the Centennial shaft, which is to be deepened to the 47th level.

★Quincy's reclamation plant at Mason on Torch Lake, erected at a cost of $1,230,000 with RFC funds, has been fully paid for out of profits. Final payment of $211,411.19 and interest was made out of earnings in the first six months of 1947. Practically all the profits in the last 15 months have been applied to payment of this debt.

★In the first half of 1947 the plant handled 545,514 tons of stamp sands, recovering 2,254,605 lb., or an average of 4.13 lb. of refined copper per ton of tailings. Operating profit was $242,438.26. Income in excess of operating costs and payments to RFC was $26,277.12.

★Isle Royale Copper Co. will pay a dividend of 50 cents per share on Oct. 23 to stockholders of record Sept. 30.

NORTH CAROLINA

★Feldspar Flotation Corporation, Spruce Pine, N. C., has been incorporated in North Carolina with authorized capital stock of $300,000, of which $15,000 has been subscribed by the incorporators, H. A. Durham, Asheville, N. C., W. F. Deneen, Erwin, Tenn., and C. P. Rogers, Tryon, N. C.

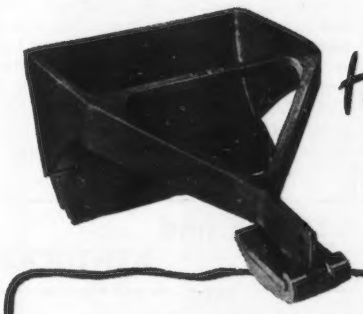
GEORGIA

New Riverside's ocher sales off as dollar shortage causes exports to shrink

★J. R. Dellinger, Cartersville, Ga., states that he will start at once to replace the recently burned magnetic-separator section of his barytes plant at Tiff, Mo. He reports also that the Dellinger and Duckett plant, Athens, Tenn., is operating at capacity with improved demand for barytes.

Commenting on the ocher market,

THE CATE MINE SCRAPER



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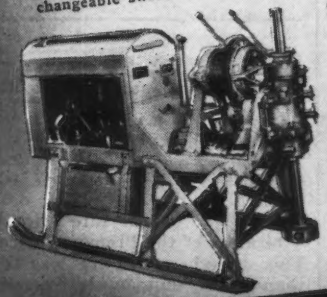

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Georgia (*Continued*)

Mr. Dellinger said that the foreign situation, especially in England, has had a decided effect in reducing ocher sales by the New Riverside Ochre Co. at Cartersville. Exports to South America have shown a drop. The New Riverside company has received inquiries from domestic corporations as to use of ocher in new processes.

ILLINOIS and KENTUCKY

Another sink-and-float plant started. Work stopped at Guill plant near Salem

★Kentucky Fluorspar Co. started its new Western Knapp Heavy-Media separation plant, at its Marion property Oct. 6, according to R. N. Frazer, president. This company is the latest, among half a dozen operators in the Kentucky-Illinois fluorspar district, to install sink-and-float plants recently.

★Inland Steel Co.'s Fluorspar Division, Rosiclare, Ill., plans to build a loading dock on the Kentucky bank of the Ohio River, opposite Elizabethtown, Ill. Conveyors for loading barges will be installed. The ore for shipment will come from Inland's Keystone mill, near Salem, Ky.

★A contract for exploratory drilling on its properties in the Kentucky-Illinois district has been awarded by Aluminum Ore Co.'s Fluorspar Division to O. B. Wardlaw, Marion, Ky.

★Boundary-line drilling is under way between the Wall property of Inland Steel Co. and the Anna Davis property of Ozark-Mahoning Co. in the Cave-in-Rock, Ill., area.

★Inland Steel Co. has temporarily suspended work at its Guill fluorspar mine, near Salem, Ky.

TRI-STATE

Oronogo open pit down. Garrett mine being opened on $165,000 loan from RFC

★Production of zinc concentrates in the district held around 2,500 tons weekly during September, or about 45% of the output rate prior to the expiration of the Premium Price Plan. This, together with the loss of more than $1,000,000 monthly from Federal premiums, nearly gives the district's economic picture after three months without governmental assistance, as well as the position of the small mine operator and other marginal producers. At the beginning of the month Eagle-Picher increased the

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Tri-State *(Continued)*

blende price $8 a ton to $72 a ton at its Central mill, and the following week the open market price was advanced from $64 to $70.35 a ton for float and mill grades, without any change in the metal quotation of 10.50c. a pound, East St. Louis. The Eagle-Picher settlement price for concentrates produced at its Central mill is the highest level for blende in 30 years. An official said the higher price was set to assist the small, independent producer and to encourage the movement of a greater tonnage to the company's huge mill to maintain its efficiency.

★Guy H. Waring, of Oronogo, manager of Oronogo Mutual, announced suspension of operations at the company's open-pit mine at Oronogo for an indefinite period. The company, in cooperation with others interested in the area, will pool their interests in keeping the area dewatered until March next year to see what happens meanwhile. Approximately 5,000 g.p.m. must be pumped to keep the area drained.

★Clarence Zuvekas, Joplin business man, has announced that final papers had been signed for a $165,000 RFC mine-development loan and that work will start at once for development of the Old Eagle-Picher Garrett mine lease, three miles north of Treece, Kan. Approval of the loan was based on test drilling by Zuvekas and later by the Bureau of Mines. Zuvekas put down nine holes and the Bureau five, obtaining an average of from 5 to 6% in zinc and lead recovery. Three hundred and seventy-five thousand tons was blocked out, with an additional half-million tons of possible ore, according to Zuvekas. He has leased 620 acres of land near the Garrett shaft. Three 2000-gpm. Byron-Jackson deep-well pumps, each driven by a 300-hp. motor, have been ordered. They are a new line of pumps for the Tri-State. Development ore will be treated in the Eagle-Picher Central mill. Development work will be done under the name of Lavrion Mining Co.

★Messcave Mining Co. is dewatering the old Kursch-Savage mine on the Hubbard land at Badger, Kan., according to Charles A. Murray, one of the partners.

★Galena Mining Co. has taken over the operation of the Eagle-Picher Murphy open-pit mine in the Short Creek bottoms, northwest of Galena, and have the property nearly dewatered. The company, operated by Fred H. Childress and Sons, has been operating several pumps for several weeks. The water will be lowered to 80 ft. depth where the Eagle-Picher Mining & Smelting Co. formerly worked until the Premium Price Plan expired. Childress & Sons, who also operate the Mahutska Mining Co. in Oklahoma, expect to resume work

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Last year, 22 of the largest steel companies, representing 88% of the capacity of the country, earned less than $5 per ton on their production. If rods had sold for $5 per ton less, sacrificing all profit to the industry, it would have affected the ultimate price of 3/8" x 6" Carriage Bolts by approximately 1%. STEEL IS CHEAP.

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Tri-State (*Continued*)

early in October at the Jeff City mine. They also operate the Mark Twain Mining Co. and the Vanatta lease in Kansas.

★Cameron & Henderson, Inc., is stripping a shallow lead deposit on the old Admiralty lease near Lytle creek, south of Cardin, according to L. F. Schofield, manager.

NEW YORK

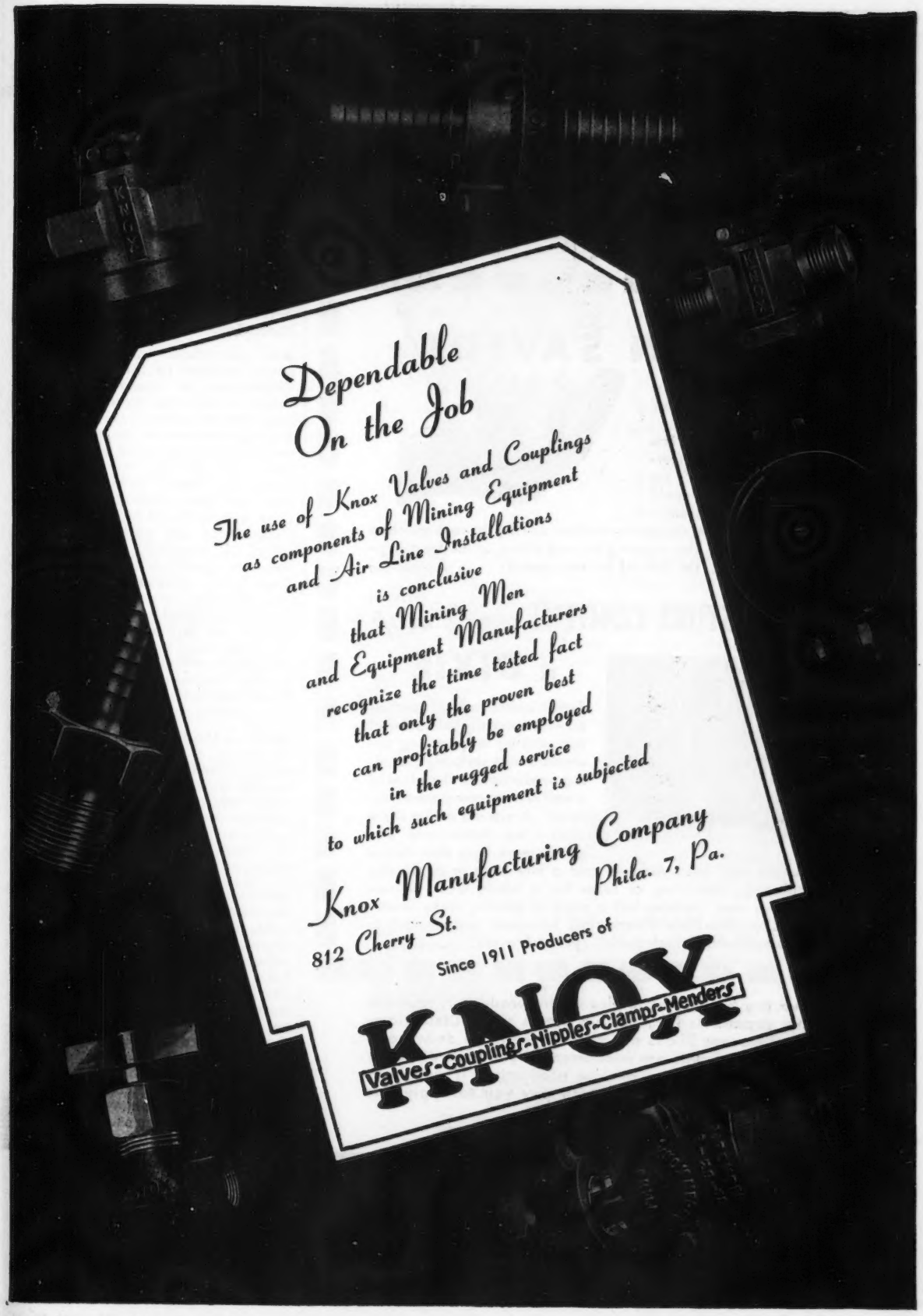
★Underpinning & Foundation Co., Inc., 155 E. 44th St., New York, has the contract for the design and construction of the shaft for R. T. Vanderbilt Co. near Balmat, St. Lawrence County. (*E&MJ.*, Sept. 1947, p. 126). This is a three-compartment 7x14-ft. shaft. It will be 771 ft. deep. The work is already under way.

COLORADO

A.S.&R. to sink shaft at Kokomo property—Placer operation will start near Leadville

★American Smelting & Refining Company's success at its Lucky Strike property has caused that company to extend its holdings near Kokomo. It now contemplates sinking a 450-ft. shaft to follow up diamond-drill operations. The shaft will be sunk on holdings above the Robinson mine. Lucky Strike ore is said to be richer than the ore mined from the Robinson. The Lucky Strike has made some shipments that returned $4,500 a car or better in silver, lead, and some gold, including premium payments made by the Government. Some of the ore averaged 50% lead. The ore in the Robinson mine yields sulphides of lead and iron, carrying both gold and silver. A report from Kokomo says that the Climax Molybdenum Co. seems interested in extensions of the rich sedimentary orebodies that underlie the Tenmile district that may run into the Climax property. Climax Molybdenum is reported to be diamond drilling near its sideline and above the Robinson mine to explore for the ore that may cross its boundaries and afford a new source of revenue. A. H. Koshman of the USGS in a report made for the Government and Colorado Metal Mining Fund disclosed that ore shoots in Kokomo mines range from a few feet to 300 ft. and more in width, and some have been mined down the dip for more than 2,000 ft., as in the Robinson mine.

★The American Zinc Lead & Smelting Co. mill north of Ouray is operating two shifts, handling complex ores in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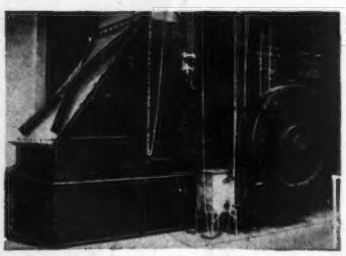

Semi-tropical rainfall combined with naturally soft material encountered in quarrying operations was seriously curtailing production in the plant of a well known cement manufacturer*. It was not until a Dixie Non-Clog Hammermill was put to work here that delays due to "choke ups" were reduced and a new high in production was established. Operating at times for a whole week on raw material which was "nothing but a mass of plastic, sticky water-sodden mud"... this Dixie Hammermill has been instrumental in keeping production at a high peak... yet at low cost. *name on request

The above are but two examples of the production miracles frequently experienced by cement plants using Dixie Hammermills. Wherever Dixies are installed costs go down, output goes up, shutdowns are minimized. If you have difficulty reaching and maintaining desired production, *if you have any crushing problem at all,* it will pay you to apply this improved crushing principle to your needs.

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Colorado *(continued)*

the area. The mill is now treating 200 tons of custom ore daily. The assay office and machine shop which were destroyed by fire a year ago have been replaced.

★Sufficient tonnage to warrant the erection of a 600-ton cyanide plant is said to be indicated by the drilling program of Western Gold Mines, Inc. recently completed at the Rito Seco property near San Luis, Costilla County. Plans are reported being made for actual construction of the mill although a definite time has not been set pending delivery of equipment. Silas P. Silverman, Crown King, Ariz., president of Western Gold Mines, Inc.

★A gold placer washing plant is newly installed by the General Gold Corporation at Longs Gulch near Leadville following the completion of tests started during 1946. Preliminary drilling was done on the property by Goldfield Cons. Mines of Nevada when more than 70 holes were put down. Later the General Gold Corporation took over the option from Goldfield Cons. and continued prospecting. Construction of the washing plant resulted. A three-cubic yard dragline has been placed on the ground. This feeds into a floating plant equipped with revolving screen, sluices and riffles. An additional unit of the same size will be put in operation as soon as the boat can be constructed. Two diesel units will generate ample power for the floating plants and draglines. Operations will be on a 24-hr. basis, and about 15 men will be employed.

★Part of the Heavy Media separation equipment at the Ore & Chemical plant at Leadville is being dismantled for the Humphreys Gold Corporation under the direction of the Mine & Smelter Supply Co. The equipment will be shipped to the Newmont Mining Corporation at their French Morocco (North Africa) property.

★With a power shovel, nine men and two trucks on the job, the preliminary work was started recently on the portal of the Kyto tunnel which the Silver Shield Mining Co. is to drive from Governor Basin 1,700 ft. under Terrible 11 mining claim. Three shifts will be put on the job. The tunnel portal is 899 ft. below Mountain Top workings and about 1,200 ft. above the Revenue. The drive is started on a vein and is entering one of the best mineral territories in this section. The old Mulvey mill is being cleared out and remodeled into residential quarters.

★Colorado Placers, Inc., began testing operations on the Groundhog placer between Fairplay and Alma, Park County.

★The London Mines & Milling Co. and the London Extension have jointly purchased the London-Butte property at Alma. This property added to the

holdings of the other two extending south of the London property, gives the merger control of practically the entire Pennsylvania mountain. The London-Butte property is equipped with a 75-ton mill, boarding house and various other buildings. The mine formerly operated through the Butte shaft. The new owners plan to extend the Butte tunnel 3,000 to 4,000 ft. beyond its present face, approximately 1,500 ft. from the portal.

NEW MEXICO

Peru company closes two mines. Continental Potash ready to start pilot plant

★Portales Mining Co., recently organized, is building a 100-ton mill at San Antonio, N. M., 11 miles south of Socorro. It is developing the Louie and Halstead copper-lead mines leased from W. E. and W. R. Blanchard and Miss Cleghorn. The mill will also do custom work. Paul Riding is president.

★R. S. Pershing, Box 1657, Lubbock, Texas, is operating his open-pit Pershing mine four miles above Bonita Dam at the head of Dark Betsy Canyon. The gold-silver ore is free milling and is being treated in a 50-ton mill.

★Due to the expiration of the Premium Price Plan, the Peru Mining Co. has closed the Copper Flat and Pewabic mines and is working only the high-grade stopes of the Kearney mine.

★W. M. Cross, Jr., president of Continental Potash Co. organized last spring, has announced the construction of a pilot plant on its property 15 miles northeast of Carlsbad, N. M. Refining is to be started soon. This company will try a solution mining method for extracting the potash salts from a bed recently core-drilled near the property of the Potash Company of America. It is operating under a Federal prospecting permit on 2,560 acres of land and is interested in potash-bearing strata 675 and 750 ft. below the surface. The commercial strata being worked by the present producers in the district lie somewhat deeper.

ARIZONA

San Manuel to sink shaft—Bagdad Copper Co. sets new production record

★The Lewin-Mathes Mining Co. has relinquished its options on a group of claims in the White Mesa mining area north of Flagstaff and has withdrawn from the project. During the

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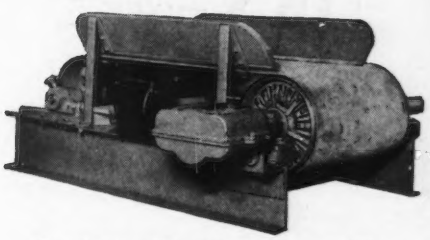

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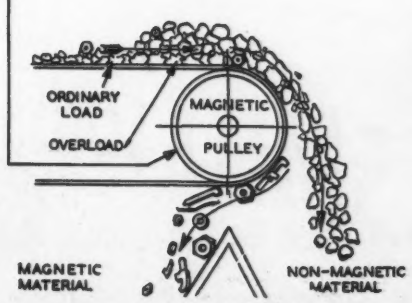

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5168

Arizona *(continued)*

company's exploration, 48 holes were drilled to depths varying from 60 to 150 ft.

★The newly formed Arizona Consolidated Metal Producers Corporation, headed by Walter Wilson, of Portal, has acquired the King-Ainsworth, King Extension, Ajax, Ajax Extension, and Calder group of claims in the Portal district. A mill, to treat both company and custom ores, is to be erected. It is reported that twenty-five men are employed here.

★The Silver Knight mine southwest of Prescott is being retimbered and prepared for mining.

★The Womack Construction Co. of Phoenix bidded successfully on approximately $300,000 of construction works for Phelps Dodge Corporation which will include a change house for the Douglas reduction works, an office building at Douglas, and a store building at Warren.

★The first shaft at the San Manuel copper ore deposit owned by the Magma Copper Co., near Tiger, is scheduled to be sunk in the near future according to a recent announcement of company officials.

Magma acquired the property several years ago and has spent intervening years in exploratory work which is continuing. About a year ago stockholders authorized a $12,000,000 stock issue to speed the development. The operations will be conducted through shafts and tunnels.

Anaconda Copper Mining Co. owns land adjacent to the San Manuel mine, and is reported looking into the possibility of starting operations there.

★It is reported that $20,000 worth of bullion has been shipped within the last six months from the White Hills mine in the White Hills district of Mohave County. Robert Payne, of Chloride, along with Russel McAllister and Earl Cook, of Kingman, obtained the property early in the year.

★Construction, designed to increase the production of copper at the Douglas reduction works of the Phelps Dodge Corporation, has been announced by Morris Fowler, superintendent. The increase will be brought about by the installation of a scrap brass handling and sampling plant on a site near the present smelter. Completion of the plant is expected within the next three months.

★The Hilltop Development and Mining Co. is being formed to handle the Hilltop mine at Hilltop. Ten men are employed installing new equipment and repairing roads, buildings, and mines. James M. Moon of Douglas is acting superintendent.

★A new record in production has been established by the Bagdad Copper Co. of Bagdad, where 90,000 tons of copper ore was milled during the month of July. The company recently completed the installation of an acid

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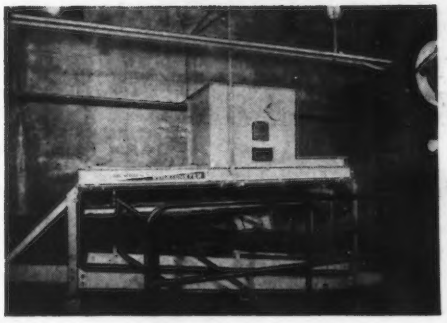

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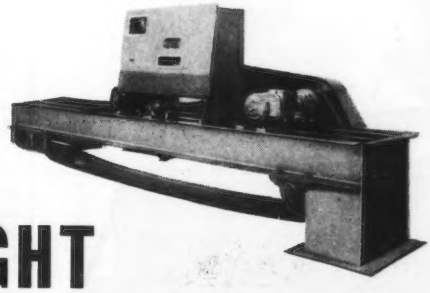

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leaching plant to handle the oxide ores, and it is estimated that this new installation will increase production by half a million pounds of copper a month. All mining at Bagdad is now by open pit methods, and a crew of 300 men is employed.

NEVADA

Calumet & Hecla explores near Tonopah—Newmont opens vein at Goldfield

★Tonopah Development Co., for which the E. J. Longyear Co. is conducting deep diamond drilling a mile northwest of Tonopah, is a subsidiary of Calumet & Hecla Cons. Copper Co., it was revealed by M. A. Diskin, former state attorney general and long counsel in Nevada for Calumet & Hecla. Two drill holes have reached the 1,500-ft. point and several more are to be drilled in hitherto unprospected ground, more than a mile distant from any productive ground. Tonopah reports said O. E. Lavroshin is engineer in charge of the project. In 1936-37, Calumet & Hecla, through its Eastern Exploration Co. unit, leasing central ground from the Goldfield Cons. Mines Co., reported net production of $1,001,000, with payment of $258,500 in royalty, from an orebody mined to its boundary by Jumbo Extension Co., with over $2,000,000 gross output. Dr. T. M. Broderick, chief geologist for Calumet & Hecla, spent several days lately at the Tonopah claims and Pres. E. R. Lovell had announced that he will inspect the operation early in November.

★Newmont Mining Corp., exploring areas at Goldfield far from the productive mines, has opened a vein at depth of 380 ft. somewhere near the reopened White Rock shaft, after having driven a crosscut more than 2,000 ft. west from the Florence, through Goldfield Cons. ground, and having retimbered the long-abandoned 380-ft. shaft on the White Rock claim.

UTAH

Premium tax rehearing denied—Union members condemn communist elements in C.I.O.

★Utah's Supreme Court denied rehearings Sept. 17 on two cases, holding that metal premium payments by the Federal Government are "income" as defined in fixing tax bases for mine occupation and net proceeds taxes.

This apparently closes a question which arose in 1944 when the mines brought suit against the State Tax Commission for including premium payments in its definition of "income" in computing the two mine taxes. The

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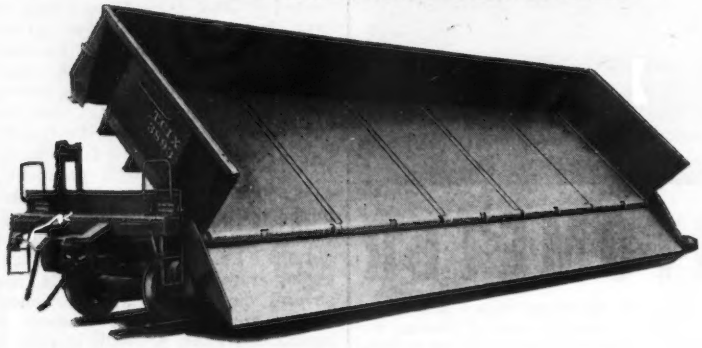

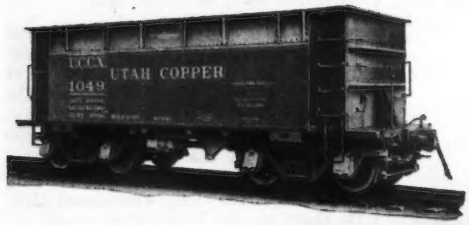

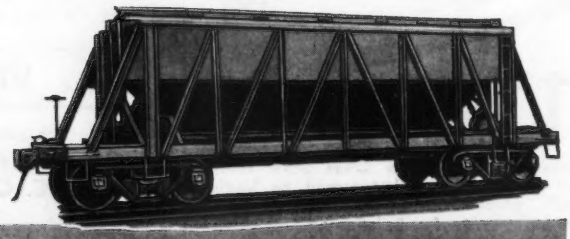

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Utah (*continued*)

mines' contention was upheld by the Third District Court, but reversed Jan. 6, 1947, by the State Supreme Court in a split decision. The case also was carried to the United States Supreme Court which held that the State courts had jurisdiction.

The cases on which rehearing was denied were the Combined Metals Reduction Co. and eight other mining companies versus the State Tax Commission, and U. S. Smelting, Refining & Mining Co. and Combined Metals Reduction Co. versus Tooele County.

★Delegates to the convention of the women's auxiliary to the International Union of Mine, Mill & Smelter Workers adopted a resolution Sept. 11 that no member of the international or local auxiliaries who belongs to the Communist party or follows consistently communist policies may hold office in any auxiliary. They charged that "communist-controlled elements in the MMSW are successfully ruling and ruining a once-glorious union."

"Recent nominations for officers of the union can mean nothing more than a limited exchange in titles without change in the complexion of the controlling group," the resolution read.

Mrs. Mary Orlich, Butte, Mont., international auxiliary president who conducted the sessions held in Salt Lake City, said her stand against Reds had brought repeated attacks and threats from them. "I am opposed to communism and intend to fight against it—if I have to be tarred and feathered in doing it," she said.

Willard Y. Morris, legal counsel for the state CIO and for District 2, MMSW, said communists are "fighting ruthlessly to gain control of the labor movement" and that communism is opposed to democracy. He expressed hope that Philip Murray, in dealing with communism, "has the wisdom and courage to recommend effective means to remove Reds from CIO ranks." He said he expressed his own views, not necessarily those of the unions he represents.

Mr. Morris said the Government, through the Taft-Hartley Act, has stepped in to aid the CIO in "cleansing unions of communism." Of the Taft-Hartley Act in general, he said, "The best way to prove unworkability of the Taft-Hartley Act is for unions to use it."

★War Assets Administration has forwarded a counter offer for proposed sale of the Kalunite, Inc., plant in Salt Lake City to J. R. Simplot, Pocatello, Ida., fertilizer manufacturer. Terms of the proposal have not been disclosed. Mr. Simplot offered $510,000 a month ago and had originally offered only $255,000.

★Elmer Ferrels Houghton, 38, miner of Lehi, was killed Sept. 8, when roof supports in the Lark mine of United States Smelting, Refining & Mining Co. gave way.

★Joseph T. Lovato, 55, Kennecott Copper Corporation employee, died Sept. 23 in a Bingham hospital after having received injuries in a blasting accident the day before.

★William J. Lowe, Salt Lake attorney, was appointed trustee of the defunct National Tunnel & Mines Co. in Federal district court Sept. 15. Edgar C. Jensen was appointed attorney for the trustee.

CALIFORNIA

Transierra plans production at North Star. Nonmetallics discussed at San Francisco

★A conference on nonmetallic minerals was held in San Francisco Oct. 23 in connection with the Pacific Chemical Exposition. Sessions were sponsored by the Mining Committee of the San Francisco Chamber of Commerce and the San Francisco Section A.I.M.E. B. C. Austin, San Francisco consulting mining engineer and chairman of the Mining Committee, and G. L. Fox, of the Industrial Department, represented the Chamber. Those representing the San Francisco Section included Lawrence B. Wright, chairman; W. W. Mein, Jr., member of the Executive Committee and R. E. Tremoureux, president, U. S. Lime Products Corporation, San Francisco.

★Early production at the North Star mine near Tuolumne is scheduled by Transierra Gold Mining Co. following an extensive development and rehabilitation program. A body of milling ore 10 ft. wide has been exposed at 130-ft. depth in the shaft. The south drift on the 250-ft. level has been extended 280 ft. toward the intersection of the Pennsylvania vein. The north drift on the same level has been advanced 250-ft. exposing a new ore shoot and will soon enter the 30-acre leased Scanavino property adjoining. The company also plans to reopen the Laura mine through the 1,240-ft. drift which runs toward the North Star shaft. The Laura is said to have considerable ore. Construction of a 40-ton flotation mill is proceeding. W. A. Hayes, Oakland, is president and general manager.

OREGON

Surface mining vs. farming is receiving attention from interim committee of Legislature

★Gem mining has been expanding in the State until it is estimated that production of cut and rough gems amounts to about $1,000,000 annually.

★A study of surface mining opera-

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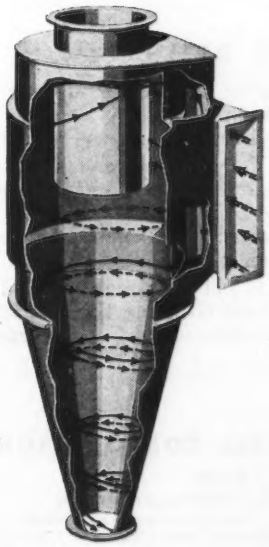

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UNITED STATES STEEL

Oregon (*continued*)

tions as related to farming is being made by a Legislative Mining Interim Committee. The complaint in the eastern part of the State was against gold dredging. Two dredges using bucket lines are operating, Porter Brothers, near Granite, and Sumpter Valley Dredging Co., near Sumpter, beside dragline dredges and various types of placer operations.

MONTANA

Mining Association protests freight rate increase and urges continuation of RFC development loans

★The Mining Association of Montana has sent a formal petition to the Interstate Commerce Commission at Washington, D. C. and the Board of Railroad Commissioners of Montana, protesting freight rate increases under proceeding Ex Parte 166. The Montana Board of Railroad Commissioners also sent a petition to the ICC, protesting the increase.

★Wilson Creek Development, Inc. has incorporated in Montana with a capital of $50,000. Incorporators of this mining company are A. H. Taylor, Robert J. Bakerville, B. R. and B. N. Reddington, David F. Thomas, T. and S. C. Morgan, Charles A. Houghton, Nat Chamberlin, and W. J. Bartlet, all of Jefferson City, Jefferson County.

★Mining Association of Montana has submitted a brief to Senator C. Douglass Buck, chairman of the Senate Banking Subcommittee, holding hearings on lending policies of the Reconstruction Finance Corporation. The association urged that mining loans be continued, especially development loans, as a function of the RFC. It is the contention of the association the these loans are necessary until taxes are reduced in order to provide venture capital and until state and national financial restrictions are modified so that venture capital may be obtained by legitimately selling mining securities to the public. It is further contended that the record of repayment of mining loans heretofore made by the RFC has been as good as any other industry.

★Gailen T. Vandel, Helena, chief engineer with Porter Bros. Corp., has resigned that position to become vice president and general manager of the Jardine Mining Co., operating a gold, tungsten and arsenic property at Jardine, Park County, near the Gardiner entrance of Yellowstone Park. The company employs more than 100 men.

★Governor Sam C. Ford of Montana has appointed members of the State Commission to Study Occupational Diseases which was authorized by the 1947 Montana Legislature. H. J.

Rahilly, Butte, general superintendent of Mines of the Anaconda Copper Mining Co. and Carl J. Trauerman, Butte, manager of the Mining Association of Montana, represent industry; James D. Graham, Helena, president of the Montana Federation of Labor (AFL) and Mike Lacey, Butte, head of the State CIO, represent labor, and Dr. F. I. Terrill, Galen, superintendent of the State Tuberculosis Sanitarium, will occupy the membership specified for a physician and surgeon.

IDAHO

U.S.G.S. to map Silver Belt—Idaho mines ship phosphate to Japan

★The United States Geological Survey has undertaken official study and mapping of the so-called "silver belt" in the Coeur d' Alene district. S. W. Hobbs and A. B. Griggs, geologists from the department's Spokane office, are in charge of the preliminary work, with headquarters in Wallace. The work is expected to extend over a period of from three to five years, since it takes in a big scope of territory extending from the Bunker Hill mine in Kellogg to the Montana line east of Mullan, a distance of some 25 miles.

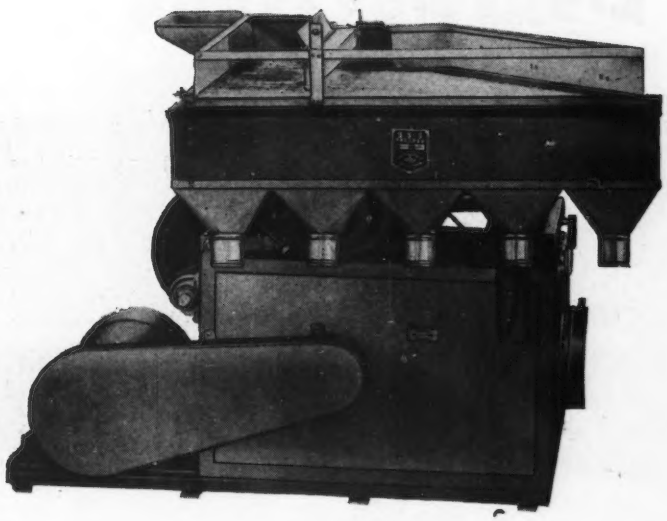
This section of mineral territory is undergoing an intensive program of deep development. Six independent mining companies are sinking shafts in the belt to an objective depth of 3,000 ft.

★Idaho phosphate mines are now shipping phosphate fertilizer to Japan, according to Harry W. Marsh, secretary of the Idaho Mining Association. Mines near Montpelier, Conda and Pocatello are now shipping 1,500 tons of phosphate per day to Japan under Government orders, said Marsh.

★The University of Idaho School of Mines announces that Idaho possesses large sandstone beds containing low grade values in manganese, and that laboratory tests made by L. S. Prather, bureau metallurgist, show that a commercial product can be recovered at low cost. The manganese content of the sandstone can be recovered according to A. W. Fahrenwald, dean of the University, by either of two leaching processes. Leaching raw ore with sulphur dioxide gives complete extraction of the manganese. Satisfactory recovery could also be expected by roasting the ore in a reducing atmosphere, followed by leaching with sulphuric acid.

★Lucky Friday Silver-Lead Mining Company, operating at Mullan, has received net smelter returns of $43,349.38 on the second shipment of ore from the 1400 mine level. Two cars of lead shipped to the AS&R plant at East Helena netted $41,012.35 and two cars of zinc shipped to the Sullivan

MODERN ORE DRESSING AIR TABLES



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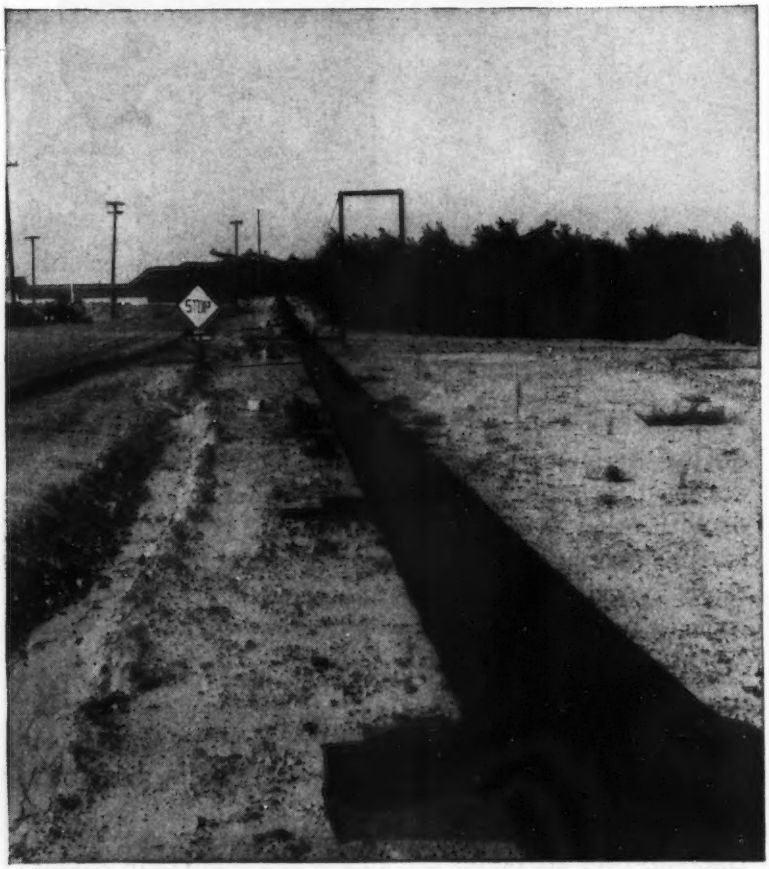

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Idaho *(Continued)*

zinc plant at Kellogg netted $2,337.03. The shipments represented the concentrates recovered from 1,997 tons of mine run mill ore treated at the Golconda milling plant. The first shipment of ore from this level totaled 1,329 tons of mill feed which netted the company $48,113. A third shipment is now ready for the mill. The company is on a steady production basis and with the manpower available is producing 50 to 60 tons of ore per day.

The ore shoot on the 1400 level has been proven and prepared for stoping for a length of 450 ft. The company has 400 ft. of stoping ground from the 1400 to 1000 level and an undetermined ore reserve above the 1000. The easterly extension of the vein on the 1400 level is also at present undetermined.

★In driving a crosscut in its lower tunnel to connect with the Sunset Minerals shaft, the Lookout Mountain Mining Co. encountered a vein of milling grade lead-silver ore in Prichard slate formation in the Pine Creek district west of Kellogg. The company is preparing to assume the cost of driving a long crosscut into Lookout ground from the Sunset Mineral's 1000-ft. level.

★Hunter Creek Mining Co. is driving a crosscut north from the 1400-ft. level in the Lucky Friday shaft. This crosscut will prospect two known veins which are exposed in the Vindicator tunnel on adjoining property to the east. The north vein of the two shows a wide shear fissuring just north of the White Ledge dike and contains a continuous streak of galena ore carrying high silver and lead values. Hunter Creek has about 1,000 ft. to drive to cut this fissure. Progress is being made at the rate of 11 ft. per day.

★A modern custom milling plant is being planned for the Hailey district in Central Idaho, according to Frank Plughoff and W. R. New, of Hailey, who are financing the project. It is estimated the plant will cost $100,000 and will be located at the mouth of Bullion Gulch. Enough ore has been left on old dumps in the district, the sponsors estimate, to operate a 150-ton capacity mill over a period of six years.

★The Black Bear mine in the Burke Canyon has been taken under lease and option by Lloyd Stenstrom, of Spokane, and G. W. Ringle, of Kellogg, who are equipping the property for production and development. Leasers have been producing from the property for several years in a small way. The mine is on the same vein system as the Federal company's 'Frisco vein, which is in heavy production.

★The Whitedelf Extension Mining Co. at Clarksfork, Idaho, reports that diamond drill exploration has recently

drilled through a good sized vein of ore and assays from the drill cores give returns of $112 per ton. A second hole drilled to check on the first one has cut through a streak of ore which is reported to be 12 in. wide and assays 78.4 oz. silver per ton.

★The Douglas Mining Co. on Pine Creek, whose property has been producing under lease during the premium payments of zinc, has suspended production, but the company has let a contract for several hundred feet of crosscutting and drifting on the lowest mine level.

★The Gold Hunter mine at Mullan is unwatered down to the 1200 level, the lowest level, operating under company management. While no official statement has been made, it is presumed that the intention is to sink to deeper levels, because the mine has been productive from the lowest levels to the surface and shows an exceptionally large shear zone, some 300 ft. wide. In the meantime the mine is in production from stopes on and below the 600 level. The adjoining Morning mine, owned by the Federal Mining & Smelting Co., is down to the 4850-ft. level, 740 ft. below sea level, or 3,650 ft. deeper than the Hunter.

WASHINGTON

Spokane magnesium plant again open for lease. Pend Oreille starts sinking inclined shaft

★Public hearings on Federal air for prospecting and developing mineral deposits in the United States and Alaska were held in Seattle Sept. 8 and 9. Discussions were included on conserving existing orebodies, developing new mines, and getting reactions to continuing premium prices on zinc, copper, and lead, and perhaps one on gold and quicksilver. Various individuals urged stockpiling of strategic minerals. A. J. Erickson, vice president of a Seattle machinery company, said subsidies would not help Alaska's lead, zinc, and copper potential. He thought gold mining might be helped, and said removal of statutory limitations on the price of gold might also help, but declared adequate uninterrupted transportation was the chief problem. Frank Lilly, of Spokane, secretary of the Prospectors' and Mine Owners' Association, opposed the subsidy plan. Later he said the Seattle hearings were conducted by a committee that wanted only support for the Premium Price Plan.

★The government's prospecting program in the Northwest has been considerably restricted since the war. Requests for examinations are piling up.

★According to O. M. Green, of the

3½ to 62 Continuous

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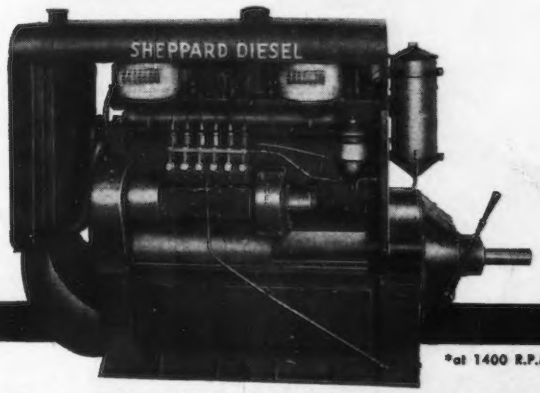

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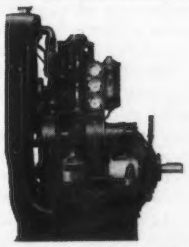
Model 6D – 3 cylinders, 28 H.P.

Model 13 – 2 cylinders, 16 H.P.
Model 13D – 2 cylinders, 18 H.P.



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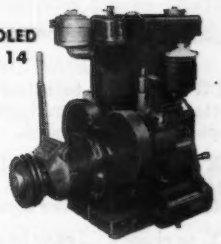

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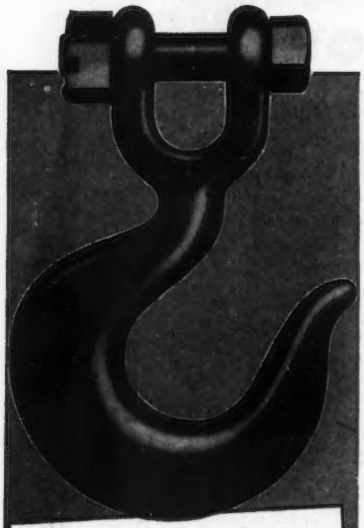

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Washington *(continued)*

Spokane RFC office, applications for mining loans are continuing to be received and considered.

★According to War Assets Administration's Seattle office, the Spokane magnesium plant is again on a negotiable basis for interested parties due to a cancellation of American Chrome and Magnesium Industries' option to operate a pilot plant there for reducing olivine ores.

★Pend Oreille Mines & Metals Co., at Metaline Falls, has cleared a site on the east side of the Pend Oreille River and has begun sinking its long projected two-compartment inclined shaft there.

CANADA

East Malartic output up—Three gold mines now active in NWT—No more dividends this year for Central Patricia

★Production figures released by the Dominion Bureau of Statistics for the first half of 1947 show a general improvement over the same period in 1946, although totals are about half those for the first six months of 1941 (not including coal, petroleum, and natural gas). Lead, silver, and zinc were lower than a year ago, but copper, gold, nickel, asbestos, cement, clay products, feldspar, gypsum, lime and salt were higher.

★In August, iron and steel production, nonferrous metals, and nonmetallic minerals turned downward. The drive for additional workers in the mining industry was assisted to some extent by the transfer of a few Nova Scotia coal miners to hard rock mines in Quebec and Ontario. Average weekly wages paid miners working on metallic ores increased from $43.72 to $44.95 on July 1, compared with $41.28, the average paid coal miners. Metal mines reported 39,128 employees July 1, when nonmetallic mining (except coal) employed 15,809, an index of 145.8 compared with 100 for June 1, 1941.

★In the Northwest Territories it is reported that three gold producers are now active, and advanced development at other properties indicates one or more new producers in 1948. The Dominion Government is financing the Snare River hydro development located 94 miles north of Yellowknife, where 4,500 h.p. is now available from the Bluefish Lake power source developed previously by Consolidated Smelters. Next summer 8,000 h.p. is to be available from the Snare River plant, which can increase capacity to 25,000 h.p. when it is required. Yellowknife is also served by an airbase that accommodates the biggest planes

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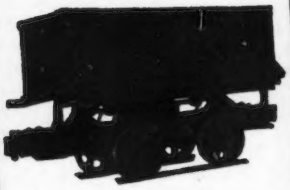

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used in the north. Abundant supplies of gasoline and fuel oil, available from Norman Wells, located on the Mackenzie River 500 miles from Aklavik, are expected to replace wood as fuel for mining operations in the Yellowknife district. Uranium production is reported to be continuing at capacity at the Government-operated Eldorado mine, Great Bear Lake, and concentrates are shipped to the refinery at Port Hope, Ontario. The Northern Transportation Co., also Government-operated, has 14 tugs and 37 barges of steel construction for transportation over the 1,350-mile route from Waterways to Aklavik.

★This summer important progress has been made in exploring the Labrador iron ore prospects. Preliminary diamond drilling and surface work have indicated upwards of 100,000,000 tons of high-grade hematite on large concessions controlled by Hollinger.

QUEBEC

★The Western Quebec Accident Prevention Association, supported by a contributory plan in cooperation with the mining companies, was announced September 30 by the Quebec Department of Mines. R. H. Taschereau, chief mines inspector, reported ordering a pair of rescue units mounted on trucks, similar to equipment employed in Pennsylvania coal mines. These trucks are to be stationed at Val d'Or and Noranda, serving all mines in the district from these centers. Instructor-drivers will also tour the Quebec mining camps and teach the use of rescue devices to special squads at the various operating properties.

★Gulf Lead Mines, holding a concession of 252 square miles along the east coast of Hudson Bay 450 miles northeast of Moosonee, started work on the property in September. This followed an examination of the ground by L. B. Almond, who reported the occurrence of high-grade lead-zinc ore in limestone in the section near Ruby Lake. Four diamond drills have been shipped to the property to carry out exploratory work. Camps have been built and 125 tons of supplies delivered to the camp site near Richmond Gulf. Monte E. Holtzman of Toronto is president and Wm. A. Rockefeller of New York is one of the directors.

★Andrew J. Davis, president of East Malartic Mines, reports the gradual return to a normal production rate, with 17,018 tons milled in June and 20,067 in August. Labor shortage persists as a serious problem. Next year it is planned to make a complete change-over to the new No. 4 shaft, of which the reinforced concrete headframe is to be one of the most efficient in Canada. All the auxiliary plant and services are to be housed under the one roof and serviced by inclined truck ramps, with the plate room, machine shop, blacksmith shop, electric shop, and boiler house housed on two floors below the ground level. Crushed ore is to be carried by con-

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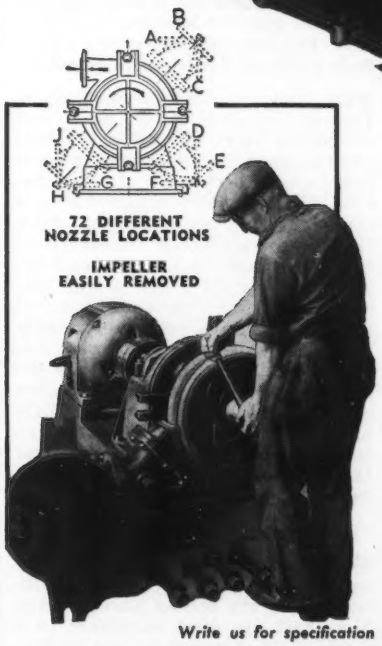

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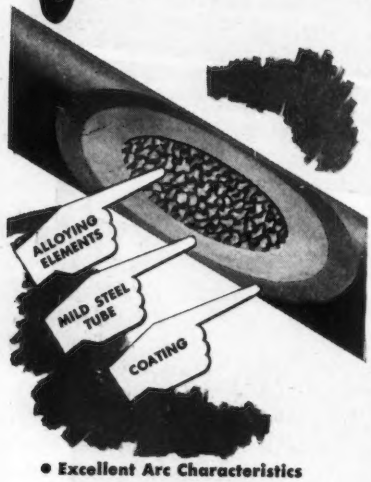

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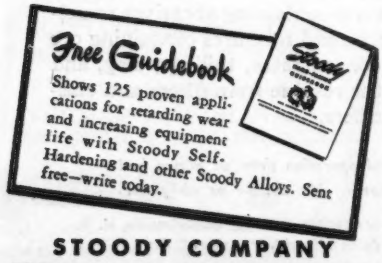
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Canada (*continued*)

veyor 1,400 ft. from the headframe to the mill building, the installation including three transfer houses. D. M. MacLean is mine manager.

★Canadian Malartic Gold mines reports that mill capacity is being increased from 950 to 1,200 tons a day at an estimated cost of $150,000. Delivery has been promised for the heavy equipment by next July. Reduced costs for secondary crushing are expected to be secured by adding a 12-ft. rod mill as a primary grinding unit, for which the mill building is being enlarged. New foundations have been poured ready for the equipment as it arrives and normal mill operations are expected to have no interruption when the new units are brought into the circuit. Mine workings are now down to 1,625 ft. and ore reserves were reported last December at 1,648,500 tons averaging $4.48 per ton. E. V. Neelands is president and consulting engineer, and Thayer Lindsley is vice president.

ONTARIO

★The 41 producing gold mines located in the 6 main camps of the province in July produced bullion valued at $5,467,735, down slightly from the previous month due to a reduction in grade from $9.13 to $8.58 per ton. Recovery was made from 636,966 tons of ore, treating a daily average of 20,597 tons, the lowest since February. Employment improved slightly from 12,601 in June to 12,665 in July.

★Dr. D. L. H. Forbes, president of Teck-Hughes Gold Mines, has issued an interim report on the first 8 months of 1947, when ore milled averaged 204 tons daily with recovery of $13.94 per ton. The reduced tonnage had been caused by the labor shortage which forced concentrating underground work on intermediate levels from the 25th to the 40th, where it was possible to get the greatest economy of labor. Costs have been substantially increased, while net profits were less than half the figure shown for the same period a year ago. Positive ore reserves at August 31 were 256,456 tons including 87,674 tons of broken ore. George C. Gilchrist is manager and George Gill is mine superintendent.

MANITOBA

★Ogama-Rockland Gold Mines Limited has decided to purchase the 150-ton mill of the former Gunnar mine. The shaft has been completed to a depth of 775 ft. and three new stations cut at the 500-, 625-, and 750-ft. levels. The present estimate of tonnage on the first three levels, based on development results, is 57,000 tons of ore grading $15.00 per ton. A stockpile of 6,000 tons of broken ore is available. A raise has been completed from the 250-ft. to the 125-ft. level and three others will be driven at the

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★San Antonio Gold Mines Limited report that a total of 98,631 tons of ore was milled from January 1st to September 2nd. This is a daily average of 403 tons; however, the present daily rate has dropped to 350 tons due to a serious labor shortage. Mill recovery, for the period under review, was 0.31 ounce per ton resulting in the production of bullion valued at $1,085,000. Present operating costs are approximately $7.00 per ton of which $2.00 may be charged to the sinking of the No. 4 winze. A 900-ft. belt conveyor will be installed to transport the ore from the No. 4 winze to the bottom of the No. 3 winze. At the beginning of 1947 ore reserves were estimated to be 720,000 tons which is in excess of five years' requirements at the present scale of operations. On the present bottom or 16th level, 1,700 ft. of ore, with widths averaging from 10 to 15 ft. and assaying approximately 0.30 ounce gold per ton, has been developed. No. 50 vein on this level has 700 ft. of continuous ore averaging 25 feet in width, equal to and in places above average mine grade.

★Information obtained by International Nickel Company of Canada Limited, from their recently completed aerial geophysical reconnaissance, has resulted in the staking of two additional large blocks of claims. One of these groups is located east of the area now being developed by Sherritt Gordon Mines Limited and the other is 15 to 20 miles east of Barrington Lake in the same general area. Drilling by Sherritt Gordon Mines Limited on the "C" anomaly has indicated 800,000 tons of low grade copper-nickel ore to a depth of 1,000 feet. Two rows of holes, 100 feet north and south of the previous drilling have contributed additional results.

★God's Lake Gold Mines Limited have been conducting exploration during the past summer in the vicinity of the parent property and also at Lynn Lake. At God's Lake two out of four holes drilled have yielded values in excess of 0.4 ounce over 5 ft. It is anticipated that these intersections will result in an expanded program of development. Diamond-drilling northeast of Sherritt Gordon Mines Limited "EL" orebody has yielded intersections with values in copper and zinc. This anomaly is only 200 ft. from the boundary of the Sherritt Gordon property.

★Wekusko Consolidated Limited reports that development work on the four levels of the Ferro property at Herb Lake has opened up ore lengths in excess of 1,000 ft. Some 3,500 ft. of drifting has been completed of which approximately 500 ft. was done prior to commencement of operations by the present organization. The ore occurs in a series of lenses which will necessitate considerable raising to prove the continuity of the veins before accurate tonnage estimates can be made.

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Canada *(Continued)*

BRITISH COLUMBIA

★The annual report of the Minister of Mines for British Columbia for 1946 shows that value of metallic minerals increased more than $6,500,000 to $58,671,502. Substantial increases were reported in returns on antimony, bismuth, and cadmium. The value of copper production declined 32% to $2,240,070, due principally to a prolonged strike of mineworkers. Production of lode gold during the year decreased by one-third to 117,612 oz., as compared with 175,373 oz. in 1945. A slight reduction in the output of lead, which aggregated 347,990,146 lb. during the year, was more than offset by a 33% increase in value to $23,489,335. Production of 6,365,761 oz. silver showed an 84% increase in value to $5,324,959 reflecting the Canadian decontrol and a major improvement in market price. Value of tin produced during the year was $480,802. Zinc production was off 10% to 270,718,128 lb., but this reduction also was more than offset by increased prices following decontrol and showed a 9% increase in value at $21,143,086.

★Privateer Mine, Ltd., operating a gold mine at Zeballos, Vancouver Island, B. C., reports that both production and underground development have been retarded during the last six months by a continuing shortage of underground workmen. N. E. McConnell, managing director, states that the No. 3 vein continues to respond favorably to development, with the 1300-level showing a length of 208 ft. averaging 2.22 oz. across an average width of 0.70 ft. Two promising sections have been opened on the No. 1 vein in the Prident section of the mine. One length of 134 ft. averages 0.90 oz. across 1.0 ft., and the other averaged 1.30 oz. across 1.05 ft. for a length of 46 ft. For the six-months period ended June 30, production aggregated 5,657 oz. gold valued at $200,067. Tonnage trammed to the mill during this period was 10,433 tons of which after sorting 6,076 tons were milled. Average grade was 0.542 oz. before and 0.931 oz. after sorting.

★Bristol Mines (1946) Ltd., reports that a diamond drill hole 75 ft. below the No. 3 level has intersected an orebody averaging 0.93 oz. gold per ton across a core width of 17 ft. True width of the vein has not yet been determined. Following the recommendations of Dr. Victor Dolmage, consulting geologist, a series of three drill holes will be driven from a station 35 ft. to the south of where the most recent high grade intersection was obtained.

★Drifting on the California vein at the new level established by B.R.X. (1935) Consolidated Mines, Ltd., at the bottom of the incline shaft has dis-

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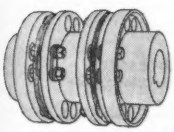

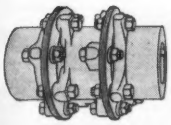

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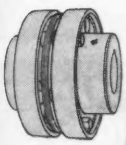

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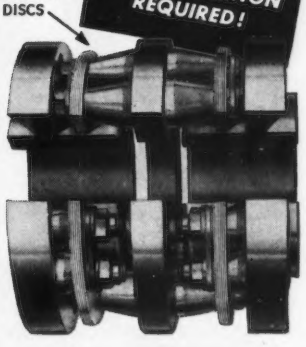

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closed material which, during a period of more normal operations, could be classed as marginal ore. Encouraging evidence in the form of better widths and good mineralization has been obtained and it is expected that when the drift reaches the zone of cross-fracturing lying about 250 ft. ahead good values will be found.

★Hollinger Consolidated Gold Mines, Ltd., major Canadian gold producer, will option 110 crown-granted claims near the great Sullivan mine in the Fort Steele mining division of British Columbia from Western Exploration Co., Ltd., operator of a silver-lead-zinc producer at Silverton, B. C. The decision to option these claims lying to the north of the Sullivan mine, and about eight miles from the mine workings, came after two months of geophysical investigation conducted by Hollinger. To the south of the Sullivan, world's greatest producer of lead and zinc, on claims aggregating about 12 square miles, Conwest Exploration Co., Ltd., has been carrying on systematic geophysical exploration for the past two years. This work is being done under the direction of Dr. A. A. Bryant, of Toronto, Ont.

ALASKA

Red Mountain chrome mine purchased by U. S. Vanadium. New strike on Salmon Gold

★Final negotiations for the Stampede antimony mine, near Mount McKinley National Park and the Alaska Railroad, were completed Sept. 6 by a group of Alaska, Alabama, and California men. Work has been progressing on a 4,000-ft. runway at Clearwater Creek, from which the ore will be sent by air to the Alaska Railroad, according to Earl Pilgrim who left Fairbanks for the property in late summer. Plans are to expand operations from 500 tons to 2,000 tons annually.

CORRECTION

The chrome mine at Red Mountain, near Seldovia, Alaska, was purchased by U. S. Vanadium Corporation, instead of Vanadium Corporation of America, as reported in *E.&M.J.*, October, 1947, page 132. The property is under development.

★A. L. Howard, president of Alaska Gold & Metals Co., was awaiting completion of the Saltchuck-Rush & Brown road, on Prince of Wales Island, in September, in order that machinery might be delivered to the Rush & Brown copper-gold property.

★A report from Hyder says an 8-ft. gold vein of undetermined depth has been struck at the Salmon Gold property in that vicinity.

★A carload of lead and tungsten concentrates has been shipped each week

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Alaska *(Continued)*

from the Riverside mine, near Hyder, to the smelter at Bradley, Idaho, according to J. H. Scott, operator. A special permit under an amendment of the Jones shipping act allows the shipping, Canadian in this case.

★Purdue University has had two crews surveying soil and permafrost conditions in Alaska this summer.

MEXICO

Mexican Government buys Real del Monte—Boom in graphite in Sonora —Rich gold strike in Sinaloa

★One of the biggest sensations in years for Mexican mining circles was the recent sale to the Mexican Government of the properties of Cia. Minera Real del Monte y Pachuca, U. S. Smelting's big silver mine at Pachuca, Hidalgo. (See also News of Industry page.) According to Mexican Government sources, the deal was made when the owners had definitely decided to close the mine and withdraw from Mexico. Payment will be made in installments by the Nacional Financiera, the Government's fiscal agency. The mine is not to be turned over to the company's 5,000 employees to be run as a cooperative, but will be administered by the Nacional Financiera in the same way that it handles Altos Hornos de Mexico, the iron and steel works at Monclova, Coahuila. Real del Monte was one of Mexico's pioneer mining enterprises and was probably the world's biggest silver mine. Its high grade ores now seem to be exhausted, but the Government believes that it can still be run profitably on its lower grade ores, if working costs can be cut. The government has hopes of doing just that.

★Satisfactory production is reported for the Minerales de Nacozari Mining Co. at its Santo Domingo mine 15 miles out of Nacozari. The company treats a 2% tungsten ore (wolframite) by tabling, and ships about 20 tons of 60% concentrate every other month to Douglas. From Douglas the concentrate goes to the Long Island plant of Wah Chang Trading Co. Perry Allen, Mexico City attorney, is president of the company, and F. H. Emerson, 1045 Ninth St., Douglas, is vice-president.

★A boom in graphite is reported from Sonora, where mines in the Guaymas municipality are exporting an average of 35 carloads of graphite a month. Other mines near Hermosillo send out 25 carloads monthly, and other smaller mines total about 20 carloads a month. Two American-owned companies: Sonora Graphite, Hermosillo, and the San Jose company, Guaymas, have recently given

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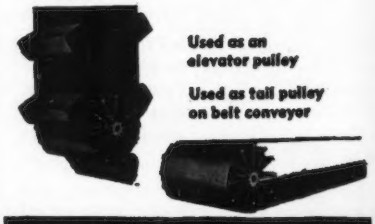

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★Reports are current of a rich gold strike at Mina Nueva in the Rosario municipality of Sinaloa, which is said to be yielding gold ore richer than that mined at La Guadalupana and El Tajo gold mines in the same area. Many prospectors are now active in that region.

CHILE

Government deports two Yugoslav diplomats as troublemakers—New health, safety program for Braden

★Actual mining affairs were eclipsed in interest in Chile last month by the worldwide attention given the action of President Gabriel Gonzalez Videla in expelling two Yugoslav diplomats from the country. As this item is being written, events in this affair are still developing, but it seems certain that a showdown is in the making on the issue of Communist interference in Chile's labor relations. It has been known for a long time that Communist agitators were active in most of Chile's labor unions, and since the three Communists were eliminated from President Gonzalez' cabinet some months ago, Communist agitation has markedly increased. The recent coal strike at Concepcion, Communist-inspired, was the last straw. The Government imprisoned the Red leaders of the strike and used the Army to reopen the coal mines. The two deported Yugoslavs had been active in fomenting this strike. Other Communist leaders are reported to have been arrested at Chuquicamata, Antofagasta, and elsewhere. The Argentine Government is showing the greatest interest in all these developments.

In a statement issued October 9, the Chilean Government said, "The workers' resistance to returning to work ....obeyed the precise instructions of the Communist Party in Chile, which in this manner carried out instructions sent by the Communist international organization, directed by a satellite power of the Moscow Government."

The two Yugoslavs expelled from Chile were: The Yugoslav charge d'affaires in Santiago, Andrej Cunja; and the secretary of the Yugoslav legation in Buenos Aires, Dalibor Jakasa. The Chilean statement said that Jakasa had brought instructions to Cunja outlining a course of strike action for Chile's Communists in accordance with plans made at the recent Communist conclave in Belgrade, presided over by Russia's Andrei Zhdanov. Terming Chile's statement as "a most fantastic slander against our government," the Yugoslavs promptly broke off diplomatic relations with Chile.

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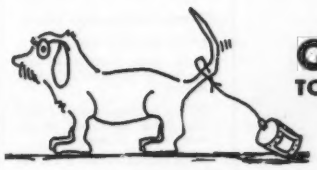

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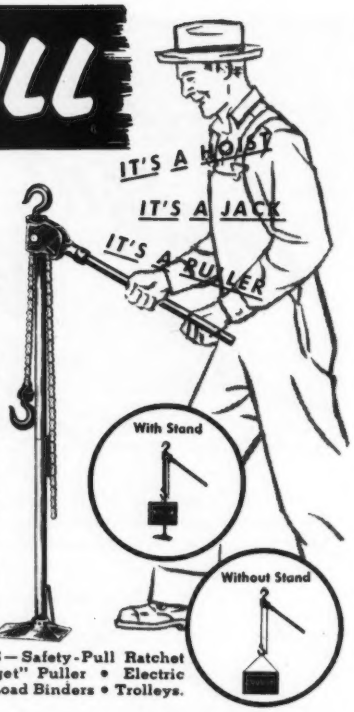

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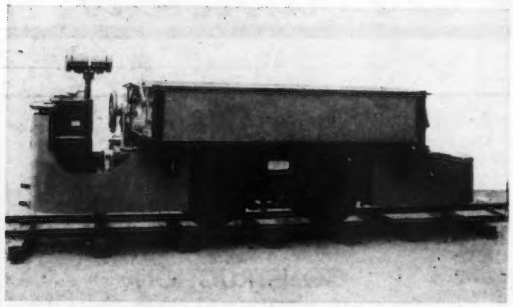

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Chile *(Continued)*

★Braden Copper Co. has been able to push its tonnage rate up to nearly 27,000 tons daily, owing to the more abundant rainfall of recent months. The company is engaged in modernizing its mill to some extent by putting in Fagergren flotation machines in some of the mill sections. These replace the Minerals Separation machines that have run at Braden ever since the early days of flotation. This change is but a part of the company's present plans for improving equipment and working conditions in mine, mill, and smelter, and when the entire program has been carried out, Braden will be one of the safest, cleanest mines in the world.

CORRECTION

In the news from Chile, published in the November 1947 issue, page 142, the McGraw-Hill World News correspondent in Santiago reported, doubtless through error in typing, that the current exportation from the Maria Elena and Pedro de Valdivia nitrate plants, was 4,000 tons monthly. This figure is in error. The New York office of the Anglo Chilean Nitrate Corporation states that their two plants average 90,000 tons production per month over a period of a year. July production was 132,000 tons, August, 98,000 tons, and September, 97,000 tons.

PHILIPPINES

Big Wedge output approaches pre-war level—Mill running at Mindanao Mother Lode—Progress at Lepanto

★The Big Wedge mine in Baguio, operated by Atok Mining Co., produced $203,000 in August from 10,400 tons milled. This was $48,600 and 2,450 tons better than in July, and it approached the pre-war average of about 12,000 tons monthly, yielding $250,000. All ore at Big Wedge now comes through the No. 2 shaft, but a third shaft has been started to replace the hopelessly-caved No. 1 shaft. Top slicing is now the mining method used, and it has taken some effort to train miners in the new style. The crosscut to the Benguet drainage tunnel must be reopened, and much development work remains to be done.

★The rebuilt mill of Mindanao Mother Lode in the Surigao district began running August 12. Ore comes from above the 200-ft. drainage level until the main workings can be unwatered. By December the mill may be handling 250 tons daily, and it is hoped to keep mill heads above $20 per ton until that time. A new vein, yielding high assays, has been uncovered on the surface.

★Production is now up to 24,000 tons a month of chrome ore at Consoli-

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dated Mines' Masinloc property. Most of the ore goes to the United States, but Great Britain is also a customer.

By the end of August, the foundations for all mill equipment and the mill building had been set up at Lepanto. Machinery should be in place by the end of the year. The mine can furnish about 500 tons of ore per day, mostly from ore already broken in the stopes. The company will try to salvage about 5,000 tons of copper concentrate from a Jap freighter sunk in the harbor. Capacity of the mill will probably be increased to 1,000 tons daily some time in 1948.

★The Phillippine Bureau of Mines will send engineers to the islands of Palau and Angaur to inspect what are reported to be large deposits of phosphate rock. The Bureau is also looking for pyrite orebodies as a source of sulphur for acid plants.

★Suspension of licenses for export of gold from the Philippines was a severe blow to local gold miners. However, gold still sells in Manila for jewelry purposes at about $45 per oz. It is believed that the suspension order was aimed not so much at the miners themselves, as at those who were bringing in large quantitjes of gold to the Philippines solely for re-export purposes.

AUSTRALIA

Gold miners may get help—Small mine pays big—Stawell area is explored—Fiji mines running

WESTERN AUSTRALIA

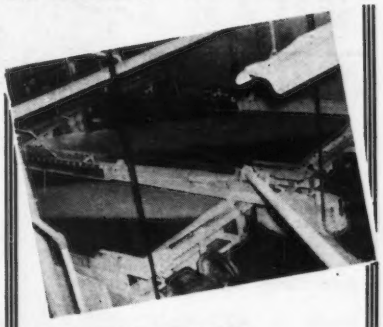
★Removal of the gold tax of 17/7½d. per oz., now contemplated as a means of helping gold miners, is likely to revive many submarginal producers. The tax has returned little more than £500,000 per year.

★The Commonwealth's decision to sell all Australia's gold output to Britain to assist in meeting the dollar crisis means that Britain will get about $31,500,000 worth of gold yearly at present levels of production. Western Australia's gold production for July reached 92,248 oz., a sharp increase, which was caused by the fact that major gold mining companies had three clean-ups in the month instead of two. Last year the triple clean-ups came in August, and production that month went to 87,536 oz.

★Failing to obtain Government assistance in underground development and plant reorganization, Spargo's Reward Gold Mine management has recommended indefinite closure of the mine.

★Wiluna Gold Mines, Ltd., closed the year ending March 31 with a net loss of £20,914. Wiluna treated 115,046 tons of ore for 18,073 oz., plus 850 oz. recovered from gold in process,

JAMES TABLES



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Australia (*Continued*)

and 3,786 oz. from re-treatment of tailings.

★A sensational gold producer is the small Mountain View mine at Day Dawn, Western Australia, operated by a syndicate of 11 men. The mine is on the northern continuation of the lode worked before 1918 by the Great Fingall mine, which produced 1,181,197 oz. of gold. Net returns to the syndicate from the Mountain View have run to £205,000, and the general average has been 8 oz. gold per ton of ore. The owners state that the Great Fingall people drove close to the rich ore shoot now being worked, but missed it because they only sampled one side of their drift. The syndicate bought the mine five years ago for £5,000.

VICTORIA

★Intensive test drilling is reported from the Stawell area, where Gold Mines of Australia, Ltd., is exploring what is the most westerly mineralized belt in the State. The mines of this field have been in heavily-mineralized quartz lodes with about 7 dwt. per ton of gold. The ore differs from the usual gold ore found in Victoria in that it must be treated by cyanidation. The customary ore of the Victoria gold fields can easily be amalgamated, with tailings too low to be treated further.

QUEENSLAND

★Exploration work is being pushed by most large Australian mining companies, the Broken Hill, N.S.W., companies being particularly active by reason of the high income they have been getting of late. Important work by Gold Mines of Australia (not a Broken Hill company), and by Australian M. & S. Co., Ltd., an offshoot of Zinc Corporation, is now being done in Queensland. The former company is engaged in the Miclere field, a gold-bearing area in central Queensland about 20 miles square. The gold may be alluvial, but its origin is not certain. The latter company is developing leases at Mt. Garnet in north Queensland, site of an old copper-zinc mine. The company has also taken a lease on the old Silver Spur mine in the south of the State, and it is also interested in the zircon-rutile beach sands along the south coast, which extend some 60 miles from the south of Brisbane to the N.S.W. border.

FIJI

★Three gold mines are now operating in Fiji: the Emperor Gold Mines, Ltd., the Loloma Gold Mines, Ltd., and the Dolphin Mine, all of them financed by Australian capital. Total return from these three mines since they began has been 783,501 oz. of gold. Capital investment in mine and plant is £905,000, and £576,000 has been spent on exploration work. The three

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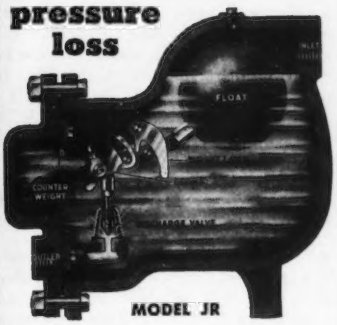

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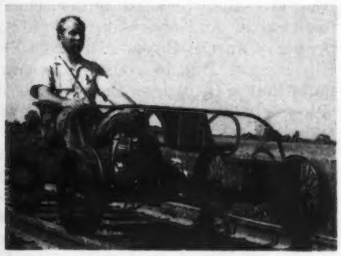

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mines produced 67,701 oz. of gold in 1946, and gold exported is now second in importance only to sugar in the island's economy. Employees number 1,346. A large exploration drilling program is planned and will begin as soon as equipment arrives.

AFRICA

New Union Goldfields transferred to company with American capital—Drill for copper near Nkana and Katanga

★Early in October, it was announced that control over the New Union Goldfields group of Rand gold mines had been transferred to Anglo-Transvaal Consolidated Investment Co. The latter company is part of a partnership with American Anglo-Transvaal Co., a company formed last year in New York by Ladenburg, Thalman & Co., and Lazard Freres & Co. In the partnership, the American interests were to furnish capital, and the British group furnished the technical experience. The venture with the New Union group marks the first real mining activity of the partnership; it also marks the temporary retirement of Norbert S. Erleigh, formerly head of New Union Goldfields. Erleigh was the youngest of the Rand's big operators, yet he is retiring from the directorates of all his companies. He has not revealed what his plans for the future are.

Most South African operators felt that this active participation of American capital in Rand gold mining would be beneficial to South Africa's dollar difficulties.

★Drilling has begun at the old Chambesi mine between Nkana and Nchanga, where the Mufulira company is looking for an extension of the rich Nchanga field. Anglo-American recently sent a geologist to Nkana to line up plans to drill the area belonging to Rhokana out beyond Nchanga near the Belgian Congo border. It is also reported that a Canadian company is negotiating with the Belgian Congo authorities for a concession in Katanga province.

★A master plan, designed to provide housing facilities for natives on a regional basis along the whole of the Witwatersrand, is being prepared by the recently-formed Rand Regional Advisory Council for Non-European Housing. The aim is to select suitable grounds for complete communities, and to plan them soundly in order to provide adequate houses, schools, hospitals, and all regular community facilities.

★New Union Goldfields announces that in a borehole about 14 miles east of Odendaalsrust, "B" reef was recently cut at 5,818 ft. assaying 9 dwt. over 13.75 in. At 6,236 ft., another reef was cut for an assay of 31.75 dwt. over 6 in. A deflection is in progress.

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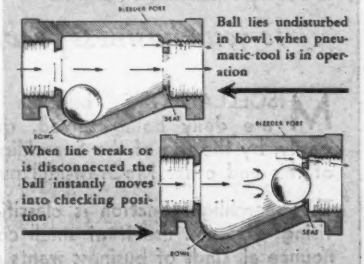
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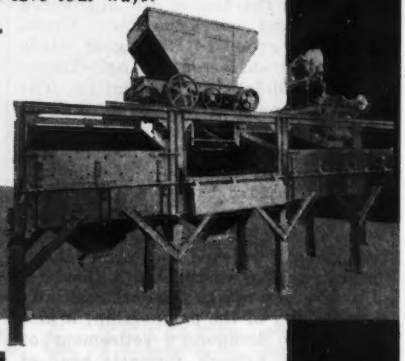

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Africa *(Continued)*

★Gold production in the Transvaal in August was 993,886 oz., or 18,372 oz. less than in July. Sixteen mines reported increased output for the month, one (Venterspost) showed no change, the rest were down. Output for the year to September is 700,000 oz. behind last year's production at this time. The lag is due to strikes early this year. Working costs for the first eight months of 1947 were 26s. 10d. per ton milled, 1s. 6d. higher than the 1946 mark at this time of 25s. 4d. Working profit per ton declined from 9s. 7d. for the first eight months of 1946 to 8s. 11d. per ton in 1947. Dividends paid dropped from £6,173,419 in 1946 to £4,879,037 in 1947.

★The Monarch mine, which is one of the last big mines operating in Bechuanaland, will be closed down because of poor results, according to a recent announcement by Tati Goldfields, Ltd., present owners of the property. The mine employed 22 Europeans and a large number of natives. Claims at the Monarch property had been worked intermittently since 1895; Tati has had the mine since 1927.

BRITISH GUIANA

★Production of 9,816 oz. gold and 240 oz. silver from 22,568 tons of ore treated for a recovery of $16.28 per ton, aggregating $367,425.86 in Canadian funds was reported by Cuyuni Goldfields, Ltd., a British Columbia company incorporated under Dominion charter and operating a lode-gold property on the Cuyuni River in British Guiana. Due to strikes and transportation difficulties, the Cuyuni development program for the fiscal year ended March 31, 1947, was retarded at least six months, the management reports. Operations are now stated to be back to normal, with production for September aggregating 1,261 oz. gold from 2,364 tons of ore treated. It is anticipated that with considerably reduced costs the company will be able to make a much better showing during this year than last, when a loss of $71,769 was incurred. Operating costs of $24.32 per ton during 1946 have been reduced to date this year to $15.00. Excellent results have been obtained in opening a new drift at the contact between the oxidized and sulphide zones on the No. 3 level. Assays averaging better than 3.0 oz. gold per ton over widths of more than 9 ft. were obtained from seven samples taken over a distance of 25 ft. on this level. Underground diamond drilling has further confirmed the persistence to depth in the sulphide zone of good values. Drill hole No. 6, 283 ft. below the No. 4 (bottom) level cored 5 ft. of ore assaying 1.29 oz. gold per ton.